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CORRIGENDA.

Page 13, line 5, from bottom, *for* 'proper' *read* 'improper'

„ line 21, *dele* the comma after 'charter'

„ 69, line 18, *for* 'buryial' *read* 'burial'

„ 80, line 3, from bottom *for* 'Yâjñavâlkya' *read* 'Yâjñavalkya'

„ 81, line 4, from bottom *after* 'specimens' *insert* 'of'

„ 83, line 7, *for* 'क्षृे' *read* 'क्षे'

„ 85, line 7, *for* 'contracts' *read* 'contrasts'

„ 115, lines 9, 10, *for* 'தென், த்தென், சென், ச்சென்,' *read* 'தேன், த்தேன், சேன், ச்சேன்'

„ 126, note § *for* 'πι-ἑδ-γω' *read* 'πι-ἑδ-jω'

„ 130, 'line 12, *for* '*(a)*' *read* '*(b)*' and in the second note *for* '*' *read* '*(b)*'

„ 141, *for* Páṇḍiya *read* Páṇḍya

ADDENDA.

Page 9, line 21 *add the following note* Saḍagopam சடகோபம் from Skr. *çaṭha-kopa* literally 'wrathful at craft' (*çaṭha*) a name for a Vaishṇava priest of the Rámanuja sect, and also for the crown of gilt copper or brass which he wears.

„ 141, line 5 *add* 'See, too, the *Mitákshará*, translated by Colebrooke, chap. I. sec. III, § 4.

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LITERATURE AND SCIENCE.

No. I.—THIRD SERIES.

July 1864.

Native Law as administered in the Courts of the Madras Presidency. By JOHN DAWSON MAYNE, ESQ., *Barrister at Law.*

ONE of the most difficult and at the same time important questions which arise after a conquest, is to decide upon the law by which the conquered race shall be governed. At a first glance there seems to be merely a choice between two alternatives, the law of the conquered, or the law of the conquerors. Indolence and liberality both seem to be in favour of the former alternative, and probably the majority of men would unhesitatingly pronounce for it, without a suspicion that their decision could be either impolitic or unjust. Yet it may possibly be both one and the other.

The law of a nation is merely an authoritative expression of its social condition, at the time the law came into force, so far as that social condition is recognised by the State. But that social condition may have passed away, or be passing away, or may be so radically unsound, that it ought to be altered. In the two former cases the law is no longer suited to the requirements of the conquered, and it would be unjust to enforce it. In the latter case, the law is an actual hindrance to their improvement, and its maintenance is impolitic. For instance, those rules which directed the sovereign to have Bráhmans alone as his teachers, councillors, and judges, were probably wise enough in the days of Manu, when all learning was possessed by the highest caste. But they are absolutely unsuitable now, and the Hindús themselves would consider it the grossest tyranny if they were observed. On the other hand, however suitable it might be to the views of Hindús, that widows should be burnt with their husbands, or compelled to lead a life of compulsory celibacy, it is evident that no enlightened ruler ought to sanction, or even to suffer, such a law.

It is evident, also, that the mere fact that a conquered nation is living side by side with a body of conquerors, gives rise to a new state of things, which ought to be considered in every sound system of jurisprudence. The days are gone by when a horde of savages could overrun a civilised state, and it may be safely assumed that every permanent conquest will signalise the victory of a superior over an inferior race. It is merely mock modesty to ignore in legislation a fact which is palpable and admitted. If the conquerors are a superior race, their social condition is probably higher, and their laws are probably wiser. Now to confine the subject population to their own laws, is simply to deny them the benefits of a better code. It is exactly the same mistake which the English made in Ireland, when they refused the rights of English law to the Irish without the Pale. Such a denial, too, tends to perpetuate those very causes of disunion between the two races which it is most important to obliterate. Religion, laws, language and dress are the four most powerful instruments of amalgamation or separation. The almost absolute union between the English and the East Indian community arises from the latter having borrowed from us all four. There is nothing to prevent the Hindú adopting our religion, our language and our dress, and it is impossible to see why he should not be allowed to adopt our laws if he chooses. In fact this was the very point that was mooted in the important case of *Abraham* v. *Abraham*, now pending in the Privy Council,* where a family of Hindú Christians had assumed the European in everything but colour, but were told by the late Ṣadr Court of Madras that they were still an undivided Hindú family, and were gravely referred for their rule of conduct to Manu and the Mitákshará. If any such impassable gulf is to be fixed between the races, it is idle to talk of educating the Native to the level of the European. It is a mere mockery to imbue him with the principles of Justinian or Blackstone, if he cannot in his own person escape from the frivolities of the shasters or the Ḳurán.

It seems to me, then, that the law which is applied to a conquered nation should be made to conform to the following canons:

First, that the subject-race should be allowed to retain so much of their own substantive law, as is necessary for the maintenance of their religion and their social usages, provided it infringes upon no rule of morality or of public policy.

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* The decision of the Ṣadr Court has been reversed by the Privy Council, in a judgment which reached this country after the above passage was in type. Their Lordships have ruled—

1st. That Hindú law is not obligatory on a Christian convert.

2nd. That his status after conversion is not necessarily governed by English law, but that he may adopt Hindú usage or English usage, or a usage compounded of both, at his pleasure.

3rd. That the usage so adopted is itself only binding upon him, or upon his family, during pleasure, and that he may change it whenever, and however he thinks fit.

This decision is an immense boon to the community of Native converts. But the state of uncertainty in which it leaves their legal position is certainly one which calls for legislative interference.

Secondly, that provision should be made for the gradual development and modification of this system of law, in accordance with the growth and improvement of the people themselves.

Thirdly, that every Native should be allowed to adopt the legal status of the conquerors—such adoption to be final, but to be made without prejudice to any existing rights.

Fourthly, that all adjective law, and all substantive law, in which public interests are concerned, should be regulated according to the best principles of known jurisprudence, without any reference to existing usages, further than policy may dictate.

Let us examine how far our administration of justice to the Natives has been in accordance with these rules.

The first point is to a certain extent provided for by express statute. The Regulation which constituted the Mofussil Courts enacts that "in suits regarding succession, inheritance, marriage, and caste, and all religious usages and institutions, the Muḥammadan laws with respect to Muḥammadans, and the Hindú laws with regard to Hindús are to be considered as the general rules by which the Judges are to form their decisions." Curiously enough, nothing is said in this regulation about suits founded on contracts, nor are the Judges required to pay any regard to the native system of land-tenures. The Charter of the Supreme Court of Madras supplied this deficiency as regards contracts. It is provided that "in the cases of Muḥammadans or Gentoos, their inheritance and succession to lands, rents and goods, and all matters of contract and dealing between party and party shall be determined in the case of the Muḥammadans by the laws and usages of the Muḥammadans, and where the parties are Gentoos, by the laws and usages of the Gentoos, or by such laws and usages as the same would have been determined by, if the suit had been brought and the action commenced in a Native Court: and where one of the parties shall be a Muḥammadan or Gentoo, by the laws and usages of the defendants." The Court was also expressly directed in all such suits, to make such rules as should be most convenient to the religion and manners of the Natives, and to the said laws and usages respectively. Here again nothing is said of land tenures, though in this case the omission is less important, since in the great majority of questions connected with land, the title of the several claimants would be a matter of contract and dealing, either express or implied. Practically, both the Mofussil and Supreme Courts have given the fullest effect to the Native law of contracts, and to all local usages affecting landed rights, so far as they have been able to ascertain them.

This, then, is the real problem: to ascertain, not what *was*, but what *is* the Native law on any given question. Here the Judge is met by a difficulty of a peculiar character. The Hindú and Muḥammadan Codes, differing as they do in almost every other feature, agree in this, that each represents itself as the result of a divine revelation. Such a Code from its very nature never can be carried out as a whole. Every lawgiver, whether human or divine, legislates with respect to the objects which he desires to effect, and the means at his disposal for detecting and punishing the infringement of his ordinances. But both the objects and the means differ most widely according to the character of the legislator. The human lawgiver aims at the security and prosperity of the community. The divine lawgiver desires the observance and spread of his religion, of which happiness is to be at once the result and the reward. The former only interferes with the conduct of men so far as it affects the interests of others. The latter forbids misdeeds as being acts of disobedience to himself, which endanger the future welfare of the individual. And as they vary in their objects, so do they differ in their means. The former is deficient in sources of knowledge, limited in powers of coercion. The latter is omniscient to detect, omnipotent to punish. Each is able to administer his own law. But as soon as a Divine Code is committed to a human tribunal, the Judge finds that he is launched upon enquiries wholly foreign to the purpose for which he was appointed; that he is unable to satisfy himself as to the guilt of the offender; that he can neither enforce the observance of the rule, nor exact the penalty for its breach. Nor does it make the smallest difference whether the Code is a real or a pretended revelation. Laws which purport to be divine will always represent that which, in the opinion of the inventor, would be the mandate of the Deity. The maxims of Manu and Muḥammad are quite as incapable of being made the text-books of a Court of Justice, as those of the Pentateuch or the Gospels.

The first difficulty, then, which encounters an Indian Judge is, that he has to administer two Codes, in each of which crimes and transgressions, duties and virtues, legal obligations and ceremonial observances are inextricably mixed up, and yet are all inculcated by the same authority. Much of the law cannot, and more of it should not be enforced; but where is the line to be drawn? More especially, how is it to be drawn by a Judge who is sworn to give the litigants the benefit of their respective religions, and who is precluded from taking into consideration his own disbelief in or contempt for the particular rules to which he is referred?

It may be said that many of these maxims are merely directory, and that it is always possible to distinguish between those which are of that nature, and those which are intended to be imperative. But so far as there is any truth in this assertion, it is merely the statement, in another form, of the fact that some branches of the law are incapable of being enforced. It is the very essence of a Divine Code that no part of it is directory, as distinguished from being imperative. It all proceeds from the same authority, and is all enforced by the same sanctions. Nothing short of absolute obedience is obedience at all. He who offends against the least part is guilty of disobeying the whole.

Nor probably can it be denied that there was once a time at which the whole body of this law was, if not absolutely enforced, at least considered as strictly enforceable. The relation between the State and the Subject was in ancient times much more paternal than it is now. The father who does not look after the morals and religion of his son would be abandoning his duty, and in many parts of the world, even now, the same duty is supposed to devolve on the sovereign. There have been few nations whose governors did not at some time or other meddle with the religion of their subjects, and make it compulsory upon them, not only to go to Heaven, but to go there by a special path marked out for them by their rulers. It is unnecessary to point to the Spanish Inquisition, when we remember that less than two hundred years ago, in Scotland, men were racked and crushed in boots for believing in the Bible without Bishops, instead of believing in the Bible with Bishops. We should wholly fail to understand the spirit or reality of many ancient Codes, if we forgot that in olden days the relationship between the Deity and his creatures was looked upon in a light which the weaker faith and colder reverence of modern times can hardly understand. Then it was no metaphorical form of expression to say that God walked in the garden with Adam. The Deity was not only supposed, but expected, to interfere actively in all the more important affairs of life, and in many of its unimportant affairs, if specially solicited. And, naturally enough, man felt himself bound, so far as in him lay, to carry out the views of one, who was not only his Divinity, but his most powerful ally. To us nothing can seem more absurd than the ancient system of trial by ordeal. To those who practised it nothing could seem more natural. When we read that there was a time, when the guilt or innocence of a Hindú was made to depend upon his power of remaining under water while a man ran and returned the length of a bowshot; or upon his succeeding in taking a ring out of a vessel without being stung by a cobra coiled within, we seem to be reading of lunatics. The essence of the ordeal appears to have been the impossibility of escape, and so it was. But the Hindú confidently expected the Deity to interfere in favour of innocence, and if he did interfere, the greater the impossibility, the more convincing was the justification. And so in the days of chivalry, when two knights met in combat to clear their aspersed honour, the words "God defend the Right" were no empty sounds, but the expression of a real belief that strength and skill would prove unavailing against the lance which was held by a pure hand.

It certainly cannot be said of the Indian Judges, that they showed any desire to ignore the religious or customary rights of the Natives, or that they were too early tormented by doubts as to their own capacity for adjudicating upon them. No doubt it must at first have been startling to an English gentleman to have to decide, whether a particular caste should be allowed to wear white shoes; whether pilgrims to a particular shrine might take their purificatory bath with any priest they liked, or only with certain special Bráhmans; whether it was good cause for excommunication, that a man having a daughter to marry, and his choice of two nephews as husbands, had intended to marry her to the younger in defiance of the prescriptive claims of the elder. Our Judges seem, however, to have behaved very much as an ordinary man would, on finding himself in fairy-land.

Having satisfied themselves, after a natural hesitation, that the whole thing was real and meant in earnest, they went into it with the seriousness of true believers. Accordingly, we find the Madras Ṣadr Court, with inflexible gravity, awarding to a claimant the precise amount of betel, and the special form of garland to which he was entitled on religious festivals. We find them laying down as undoubted law, "that institution of public worship by one of two rival sects, in innovation of prevailing usage, should not be permitted;" and anxiously enquiring of their Paṇḍits whether the same rule did not apply to private as well as to public worship. So far did their complaisance extend, that, not contented with forbidding particular forms of worship, they proceeded to regulate the ritual according to which each form should be conducted. In 1841 they decided upon the admissibility of certain mantrams, or holy verses, and in 1858 they solemnly forbade the blasts of a *tiruchunam* at some special crisis of pagoda performance; adopting the decision of the lower court, "that the blowing of a *tiruchunam* or trumpet, or the use of any musical instrument at the time of crowning the defendants with the *Saḍagopam*, whether at the commencement or conclusion of their ministration, was an unwarrantable innovation on the established and ordinary ritual, of which plaintiffs had a right to complain, and by which they would be aggrieved and endamaged in their feelings and honour."

In all these cases, the Native Judges of the original Courts had, as might have been expected, exercised their jurisdiction unhesitatingly, while the Judges of the Civil Courts frequently struggled, either to avoid trying such cases at all, or to decide them according to European notions of justice and liberty. In this effort, however, they were until 1858 invariably baffled by the older and more Indianised occupants of the Ṣadr Bench. Those Judges regarded the Natives, as a geologist regards his fossils, whose sole interest to him consists in their representing a departed antiquity. They resisted every effort to modernise the Hindú, as Professor Owen would reject the offer of an elephant for an ichthyosaurus. Their crowning triumph was when they silenced the blasts of the unorthodox tiruchunam. But this triumph proved fatal. On that occasion the Court was divided, and Mr. Strange was in the minority. He wrote an able and elaborate judgment, denying that the Civil Courts had any jurisdiction in matters of ceremonial usage. He was over-ruled, but the question arose again in 1861. The points in that case were described as being, "at what time the plaintiffs may join the defendants in the recitation of a prayer; which of the plaintiffs is entitled to do so; whether the tengala priest is entitled to a blessing to be pronounced at the conclusion of the prayer; whether a hymn may be sung in his honour; whether certain festivals called birthstar festivals are to be kept; and whether the images may be taken out in procession." On that occasion the propriety of the tiruchunam decision was canvassed, Mr. Strange's views were adopted, and the important rule was laid down, that mere matter of ceremonial or religious usage cannot be made the subject of a Civil Suit. This decision has been frequently ratified by the High Court in the present year. Leading Gurus have sued in vain for sacred cakes and blue fire, and a dispute whether the idols of the Conjeveram pagoda should, or should not, be marked with a triangle upon their noses, which had agitated Chingleput for a generation, and taxed the acumen of successive Judges and Magistrates, has at last been thrust forth, without a decision.

The ruling of 1861 was no doubt sound and sensible. But it may be questioned, whether the grounds of the decision were not reprehensibly narrow, and whether the Court did not throw away an opportunity of inculcating a great lesson upon the Native mind. If an English Rector were to sue the members of his congregation for not touching their hats to him, or for attending Little Bethel instead of the Parish Church, an English Court would meet him, not by denying its own jurisdiction, but by denying his right of action. It is evident that most of the cases mentioned before rested upon the assumption, that every thing which was old was right, and every thing which was new was a wrong. The grandchildren of dead priests, who had extracted fees from the grandfathers of living pilgrims, claimed the right in their own persons to extort similar fees from the existing generation. New pagodas and unusual processions were forbidden, on grounds which would have equally warranted an injunction against railways and gaslamps. A bold assertion of the principle of individual liberty, and a clear exposition of the doctrine, that *damnum sine injuriâ* will not support a civil action, would have gone far to release the Native from his thraldom to custom, and to terminate that state of arrested progress which is his greatest bane.

It might have been expected that Courts which were so willing to comply with Hindú usage, however opposed to common sense, in matters of religion, would have fallen into at least equal absurdities in matters of contract and inheritance. Such absurdities might naturally be expected in the Hindú and Muḥammadan laws, from that tendency to confound the immoral and the illegal—that which can be enforced by man, and that which can only be enforced by God—which, as I have already said, always marks a Code framed on the theory of a divine inspiration. For instance, the Hindú law laid it down, that all those brothers who are addicted to any vice should lose their title to the inheritance; and that, although in general sons should share alike, this was only where they were equal in good qualities; but that he who was distinguished by science and good conduct should take a greater share than the rest. The Muḥammadan law, as being more modern, and perhaps from the more practical character of its author, contains fewer anomalies. But many even of its principles, as, for instance, the legal disabilities imposed upon a prodigal, show that the distinction between prudential and compulsory obligations was far from understood. Yet our reports show very few instances of foolish decisions in this department of law, springing from a servile adherence to Native maxims of jurisprudence. Several reasons account for this. One of the most important was, that our English Judges really knew very little of Native law, and what they did know came to them filtered through a few European minds, and cleared of all its impurities, and most of its frivolities. It is difficult to overestimate the evils which would have ensued, if all our early Judges, conscientiously anxious as they would be to administer Native law, and ignorant as they generally were of the first elements of jurisprudence, had possessed sufficient knowledge of the languages to investigate for themselves the original sources of the system they were sworn to dispense. What absurdities they would have fallen upon, any Native law-book will show; while a perusal of Jagannátha's Digest will prove that those absurdities would not even have the merit of consistency. But men seldom see the worthlessness of that which they have laboured to acquire, and Judges, who had striven to be Paṇḍits, would have succeeded in producing a conflict of decisions, few of which would have been recognised by a Native as conformable with usage, and still fewer of which would have been considered by a jurist to be law. From this fatality they were saved by their own fortunate ignorance, and by the still more fortunate knowledge of a few. Men like Sir Wm. Jones, H. T. Colebrooke, Ellis, Sutherland and W. H. MacNaghten supplied the materials which were built up into a harmonious edifice by their own recorded decisions, and by the elaborate treatises of the two MacNaghtens, and Sir Thomas Strange. Their learning was sufficiently extensive to enable them to set off the glosses of one commentator against those of another. Their own personal enquiries served to show them how far the law of books corresponded with the living law of the people, and their acquaintance with general jurisprudence enabled them to systematise the whole into a body of law, which can, without an anachronism, be dispensed in the 19th century. They were not merely quarrymen but architects, and it is one of the most valuable results of their labours, that materials, which were within their reach, but which were not employed by them, may generally, and with safety, be disregarded as rubbish.

Another circumstance which tended greatly to direct our Judges, was the ready assistance which they could always command from experienced Natives. The officials of their own Courts, the Native Judges whose decisions came before them in appeal, the Paṇḍits whom they were directed to consult, were all, in a rough general way, acquainted with the state to which the law, by a long process of detrition, had arrived. If pressed by the authority of some ancient text, they disposed of it by simply saying that in the present degenerate age that was no longer law—in other words, that the nation was no longer governed by the maxims of a theocracy. Even while admitting that the particular proceeding in question was contrary to existing law, they got rid of the illegality by holding, that an act, in itself proper, might originate valid rights. In the words of the Roman maxim "Factum valet quod fieri non debuit." And it should be remembered, that this Native assistance was all the more valuable, because the very same men, who, in matters of religious or caste prejudice, would have been more irrational than children, were, in matters of secular life, as shrewd and practical a race as the world could show.

But a further fact, as important as either of the foregoing, was this, that in matters of daily civil right the Englishman felt at liberty to be guided by his own common sense. He no longer felt that the questions submitted to his consideration were matters upon which it would be an insult to his own understanding to attempt to form an independent opinion. He returned from fairyland, and decided as a man adjudicating for men. Very high authority could be produced from Native treatises to show, that the contest between creditor and debtor should be carried on with the formalities and sequences of International Law. The creditor was first to make strong personal representations of his rights. He was then to resort to the moral pressure of mediation. If this failed, he might make reprisals upon his debtor's goods, and if even this did not bring the defaulter to reason, he might (if strong enough) "having tied the debtor, carry him to his own house, and by beating or other means compel him to pay." But we may be sure that such citations would have had little weight with a European Judge, who, as Police Magistrate, was responsible for the peace of his district, and who, in his private capacity, had a favourite Arab, which might be about an equivalent for his own debts in the bazar.

There were, however, some Hindú laws and customs, which were at once too anomalous to be recognized, and too deeply rooted to be either ignored, or overthrown by mere judicial decision. The practice of sitting *dharṇa,* according to which the creditor enforced payment of his demand by starving himself at his debtor's door*(a)*, was forbidden by an

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(a) It will appear on the publication of the Brehon laws that this practice also prevailed among the most westerly members of the Aryan race, namely the Irish Celts.—W. S.

enactment of 1795. Widow-burning was first made criminal in 1829. Slavery was abolished by an Act of 1843. An Act of 1850 provided that change of religion or loss of caste should no longer be attended by forfeiture of civil rights. Finally an Act of 1856 did all that legislation can do in favour of widows' remarriages, by declaring them valid, and by enacting that after any such remarriage the widow should forfeit no rights which she had formerly possessed, except in respect to property derived from her first husband.

On the whole then it may be laid down, that with the exception of one class of cases, viz., those of a purely caste or religious character, the administration of Hindú and Muḥammadan law in this Presidency has conformed to the first canon which I have ventured to propose. It has maintained as much of the Native law as was necessary, for the preservation of the Natives' national individuality, and no more.

It is certainly curious that those who framed the Charter of the Supreme Court, and the Mofussil Regulations after them, should have fancied that all the Natives subject to the East India Company were included in the terms Muḥammadans and Hindús; or, as the Charter, absurdly calls them, Muḥammedans and Gentoos. Parsees, Jews and Armenians, and all those aboriginal Hill-tribes who are as different from the A'ryan Hindús, as an ancient Basque from a modern Parisian, are passed over in utter silence. Practically our Courts would in any given case be willing to allow them the benefit of their own laws, if they could be ascertained. But they are unascertained, and by ordinary research unascertainable. The three former of these classes are remarkable for their desire to assimilate themselves to the English, and probably the simplest plan would be to place them under the English law as it is applied in India to British subjects. As to the Hill-tribes, they are probably not likely for some time to come under judicial notice except as criminals. As they advance in civilisation, there can be no reason why they should not also come under English law, in preference to any other. In fact neither Hindú, nor Muḥammadan law can with propriety be applied to any who do not profess the religion upon which the law is based. The English system has the great advantage of being perfectly neutral.

The nature of our judicial system supplies very imperfectly that which I consider to be the second fundamental requirement; viz., that provision should be made for the gradual development and modification of the Native law, in accordance with the growth and improvement of the people themselves.

It is evident that as civilisation increases, new wants and new habits of life will arise, and these in turn will originate new rights, and call for new remedies. External commerce will multiply ships. Internal communication will introduce carriers. Money-dealings will be conducted by negotiable instruments. All of these will raise questions of law previously unknown, and the answers to these must be supplied, either by invention, or by borrowing from some system which has already solved similar difficulties. Here what is required is simply to fill up a blank. But from similar causes it will also happen, that rules which were admirably adopted to a nation in their primeval state, become absolute fetters upon them when they are emerging into a higher condition. Laws which assume that every one is in a state of stereotyped and unambitious simplicity, are absolutely injurious when society is getting broken up into new forms, and when every individual is demanding for himself that liberty of action, which was formerly reserved for the family or the village. Here what is required is, not to fill up a blank, but to remove an incumbrance.

There never has been any difficulty in supplying the former species of want. As all the advances in civilisation made by the Hindús within the last century, have been caused by ourselves, and as the tendency of these advances has been to assimilate the Native to the Englishman, it follows that whenever a blank was found in the Native law, it could be at once supplied by a chapter out of an English text-book. Nor did our Indian Judges ever shrink from adopting this principle, though they were not always happy in the way it was carried out. A great deal of so-called English law will be found in the Ṣadr Reports of the last ten years. But, by some singular fatality, it seems in general to have been introduced into India, on the same principle as that on which uniforms are exported to the colonies—because they have been cast off at home. Champerty and Estoppel, which had long since fallen into disfavour in Westminster, have been absolutely petted in Madras. Oral evidence has been pronounced inadmissible, (not merely untrustworthy) to an extent which goes beyond the strictest requirements of the Statute of Frauds. Ignorant Natives have been held bound by what they had said, and even by what they had not said, in their pleadings, with a rigour surpassing that of Baron Parke in his sternest moments. This current of decisions set in about the time that the Ṣadr Court was first attended by a professional Bar, and no doubt the two facts were connected as cause and effect. I have no doubt that the presence of the Bar was, on the whole, of the greatest benefit in the administration of justice. But it is certain that when professional advocates practise before unprofessional Judges, the tendency is to cause technicality of decision. Without the least wish to mislead, the pleader naturally presses those cases which make most in his own favour, while the Judge, not clearly seeing the principle on which they rest, or not having before him other cases by which they are explained, yields, overpowered, as he thinks, by authority. When we remember, too, that in the majority of cases, an English Barrister on one side was either unopposed, or only opposed by a Native Vakíl, the chances were increased that the scales of justice would not be held strictly even. Then the bad decision of one day was made a precedent for a worse decision the next, or a judgment, which was in itself perfectly sound, was rested on reasons so unsound as to be a fruitful source of evil. Any one who compares the earlier with the later decisions of the Ṣadr Court, will, I think, be struck with the superior power and independence of mind shown by the former, whether they were right or whether they were wrong.

Fortunately the amalgamation of the Ṣadr and Supreme Courts took place at a time when the creation of a new body of law, for which no precedent could be found in the jurisprudence of any other nation, was becoming a serious evil. Since the 15th of last August much of the redundant growth of the previous ten years has been pruned away, and we may feel assured that for the future, chapters left blank in the Native Law will not be filled in from a corrupt text.

The second want, which arises from the growing unsuitability of Native law to the advancing condition of the people, is one which our judicial, and even our legislative, system is singularly unfitted to remedy. In every other country the law, as enunciated from the Bench, almost imperceptibly adapts itself to the changing requirements of the people. In England our Common Law Judges, without legislation, and even in defiance of legislation, struck off the fetters which hindered the transfer of land, when those fetters ceased to be beneficial. After the common law had become too much hardened to receive any further shaping, the Equity Judges stepped in, and practically remoulded the common law, by relieving against much of its rigour, and by redressing evils which it refused to notice. But the Judges who so operated upon the English law were Englishmen. They experienced in their own persons, and in the persons of their friends, the inconveniences which they sought to remedy, and they were not bound by any express statute to administer an entire system of rules, whether those rules were just or unjust, sensible or absurd.

Now all such judicial modifications are effectually precluded in India by the fact that Native law is administered, not by Natives, but by Englishmen. No doubt the great majority of Judges are Natives. But practically the law is administered by those who occupy the appellate benches, and especially by those who sit in the Court of final resort. Now these are exclusively Englishmen, and therefore, if they are on the watch, the law can never assume any shape which they are unwilling to sanction. And in general they will be unwilling to sanction a change. If the nation comes to outgrow some time-honoured principle of Manu or Muḥammad, a Native Judge would be willing silently to relax the rule. Not so the Englishman. He neither feels the pressure, nor acknowledges the propriety of yielding to it. If it is pointed out to him, that clothes which fitted the boy will cramp the man, he will either deny that the boy has grown, or else reply, that he regrets the circumstance, but that he is strictly sworn neither to increase the quantity of the material, nor to permit any alteration in the cut. The result is that those who are anxious to amend the law have not the power, and those who have the power have not the inclination. From a liberal desire to give the Natives the benefit of their own law, we have put out of their reach the most effectual means of amending it.

No doubt legislation might accomplish those changes, which judicial interpretation is forbidden to effect. But in India this remedy is peculiarly slow and imperfect. Till lately the Indian legislature consisted, at first of three knots, and afterwards of a single knot, of Europeans, all from their antecedents highly conservative, and from their responsibility nervously anxious not to do anything which might alarm Native prejudice. How deeply felt, and how utterly ungrounded, such fears were, is shown by the long delay which took place before widow-burning was abolished, and by the perfect composure with which its abolition was accepted by the Hindús. It is evident that such a body was very unlikely to attempt to remodel a law, whose inconveniences they did not feel, unless some strong cry was got up against it. The Natives, however, are not a people to get up a strong cry about anything, and certainly will not exert themselves in favour of a reform. Besides, legislation aims at sweeping measures and general uniformity. But improvements in law are ever most salutary when they are most gradual, and the differences of race and usage in India render uniform legislation almost impossible.

On the whole, then, it may be said, that while the growth of the community rendered many changes in its laws most advisable, those changes could only be made by the Judges or the Legislators. Of these, the Judges who would make reforms could not, and those who could make reforms would not, while the Legislators neither could nor would.

The recent subdivision of the Indian Legislature, and the admission of Natives as Members of Council, and as Judges of the High Court, will tend to remedy the evils at which I have glanced. But I fear that it will be long before the indolence and timidity which has marked our internal administration, will give way to a bolder and wiser policy.

There are, it is true, some circumstances which have counteracted the obstacles to reform that I have just mentioned. The influence of the Native Judges and Court officials has often materially affected the decisions of those, who were too lazy or too unlearned to make up their minds for themselves. The authority of the Paṇḍits upon points not laid down in the ordinary text-books has been generally accepted as conclusive. Occasionally, too, the Privy Council, with happy audacity, has remodelled the law which it professed only to declare.

A few instances will make all this clearer.

Probably every people in its passage to civilisation, has gone through a stage in which all rights have assumed a corporate form. Whether this arose from the necessity for union to resist violence, or because the earliest conceptions of rights were drawn from the paternal government of a family, it is unnecessary to consider here. The fact is undoubted. As Mr. H. S. Maine remarks, " Ancient law, it must be again repeated, knows next to nothing of individuals. It is concerned not with Individuals but with Families, not with single human beings, but with groups."

India presents the most perfect and interesting example of this stage of civilisation. Not to mention the village communities, each of which is a little republic, complete in itself, the normal state of property here is to be vested in a family; and not in an individual. The individuals die, but the family continues. Not only does the family system exist in India, but it exhibits three distinct phases, each of which evidently marks an onward stage in the transition to individual rights. In Malabar, the family forms a Tarawád, or united community, whose entire property is managed by its senior member. The property cannot be dealt with, or encumbered by any of the members except the manager, nor even by him, except for the benefit of the family. No member can break up the tarawád by enforcing a division, and any land which he may acquire by his individual exertions will fall into the bulk of the family property. This is evidently the strictest, and therefore the oldest form of corporate union.

In Southern India, the rule is more relaxed. The normal condition of the family is still non-division, and as regards all landed property, not only a man's sons, but his grandsons, and great-grandsons are actually co-proprietors with him, and have a vested interest during his life. But, unlike the law of Malabar, the father may dispose of his moveable property as he likes, and his self-acquired property will not merge into the general family fund, but will go direct to his lineal descendants in preference to collaterals. Further, any one of the co-sharers, lineal or collateral, may at any time break up the family union by calling for his own share.

The Bengal law goes still further. A man's sons are merely his heirs, but in no sense his co-proprietors, even as to property which he has himself inherited. He may alienate some (it is not settled how much) of his ancestral landed property without their assent, and if he alienates more than he ought, the act seems to be merely improper, and not illegal. His sons cannot compel him to come to a division, even of the property which he has derived from his ancestors; and if he does divide it, he is entitled to a double share. A man's widow takes his property in Bengal, in preference to his collateral relations; whereas in Southern India she takes nothing but a right to maintenance, unless her husband was divided.

This is not the place, nor indeed have I the materials, to discuss the causes by which these remarkable changes were brought about. But it is evident, that as the law of Southern India is more favourable to energy and progress than that of Malabar, so the law of Bengal is more favourable than that of Southern India, and that the law of Bengal is, in its turn, merely a compromise between the corporate system which it is abandoning, and the system of individual rights to which it tends. Where people are living in a state of arcadian simplicity, without the desire or the possibility of advancement, the family system is a very sound one, as it prevents properties being split up, and enables a number of persons to be supported with the maximum of comfort on the minimum of means. But as soon as Society begins to dash ahead, then the effect of the corporate union is deadening in the direct ratio of its strictness. Who will work with full energy, when the benefit of his labour goes, not solely, nor even chiefly, to himself? Who will work at all, when some one else is working for him? Ingenuity could not contrive a more effectual plan for damping the spirit of the industrious, and extinguishing the spirit of the idle. It makes the best member of the family a slave, that the others may be sloths.

Now, one might have anticipated, that the same causes which made the inhabitants of Southern India partially emancipate themselves from the bondage of family union, would have made them aim at the greater freedom attained in Bengal. Accordingly Mr. Strange, in the preface to the second edition of his *Manual of Hindú Law,* laments that the practice of enforcing a division is growing much more frequent than it used to be before British Courts of Justice were established. If I may judge from my own experience of Mofussil litigation, I should say that Natives are making incessant attempts to deal with their property as if they were under Bengal law, and these attempts seem to be constantly acquiesced in by their own family, and sanctioned by the Native Judge in the original Court. I have constantly seen suits in which the only question raised by the litigants in the lower Court was, whether a particular alienation had taken place in fact: and it was not till the case arrived in the Ṣadr Court, that European Counsel took the objection, that the alienation was invalid by law, and European Judges held the objection to be fatal. I infer from this, that if it had not been for the Ṣadr Court, the Native tribunals would by this time have evolved a law, differing little, if at all, from that of Bengal. There is no doubt that the Natives of the Presidency town of Madras, have, for many years, been in the habit of dealing with their property, with the sanction of the Supreme Court, in a manner which certainly would not have been permitted by the Ṣadr Court. I do not say that the Supreme Court was right according to the Mitákshará, but I am sure its decisions were consonant to the wishes of the people, and to sound policy. Further, for many years back the Ṣadr Court had two Paṇḍits, of whom the elder, whenever consulted, always gave his decision according to strict Madras law; the younger Paṇḍit always, if possible, according to Bengal law. This got to be so well known, that the opinions of the latter on any point upon which the two systems differed were invariably set aside as a matter of course. But if the other Paṇḍit had been of the same reforming school, or if the Bench had not possessed a Judge so skilled in Southern Law as Mr. T. L. Strange, and so eager for its maintenance, we should probably, ere now, have slid insensibly from the Mitákshará of Madras to the Dáyabhága of Bengal. And therefore I believe that the Madras Ṣadr Court has been preserving the purity of the law against the wishes of the people, and that it has checked the natural modification which the law would otherwise have received.

It is curious to trace the fate of Wills, as an instance in which that modification was, by little more than an accident, carried out.

No doctrine seems to be more thoroughly established, than that wills are unknown to Hindú Law, and even to Hindú language. This was implied from the corporate theory of property. It would be a contradiction in terms to suppose that a man who was only entitled to a joint enjoyment of property, as a member of the family, could by will dispose of the whole or any specific part of it. This would be to allow him greater power over the family-estate after his death, than he had possessed during his life. At the same time, so inevitable is the tendency of the human mind to grasp at larger and longer dominion; so certain is the transition from management to proprietorship, that the same causes which were gradually raising the rights of the individual at the expense of his family, were sure, sooner or later, to extend the power of alienation during life to that of disposition after death. In Bengal, where the rights of the joint owners were rapidly crumbling away before the usurpation of the manager, it might have been expected that this final step would be taken at the first favourable opportunity. This opportunity was presented by the establishment of the Supreme Courts, which were prepared to look upon wills as a mere matter of course. Accordingly we find that in Bengal, even beyond the jurisdiction of the Queen's Courts, the practice of testamentary disposition soon sprang up, and was readily recognised. It was a novelty no doubt. But so wide had the powers of the head of the family already become, that it was a novelty rather of form than of principle. In Madras, during the whole of this century, Native wills were unhesitatingly admitted to probate by the Supreme Court. But although it is certain that the Queen's Judges favoured the desire to make wills, it is equally certain that they did not create it. This is shown by the numerous instances of wills which came under the notice of the Mofussil Courts. There, however, their fate was different. The Hindú law which prevailed in Madras was so much stricter than it was in Bengal, that wills were generally scouted on their first appearance as radical innovations. In 1824, no doubt, the Madras Ṣadr Court laid it down as their opinion, "that under the Hindú Law, a man is authorised to dispose of his property by will, which under the same Law, he could have alienated during his survivorship, by any other instrument." This decision was confirmed by the Privy Council. It did not however settle the question. The facts of the case rendered the decision upon the testamentary power of a Hindú almost extra-judicial, since the so-called testator had actually placed his so-called devisee in possession of the property during his life, and all this was recited in the will. In reality, therefore, for the purposes of the case, the instrument was not a will but a deed of gift, and deeds of gift had always been recognized by Hindú law. Accordingly numerous cases followed in which the Madras Ṣadr Court expressly denied the validity of Hindú wills, and the Madras Regulation V of 1829 pronounced, that they were "instruments unknown to the Hindú law," and provided, that they should "have no legal force whatever, except so far as their contents might be in conformity with the provisions of the Hindú law, according to the authorities prevalent in the respective provinces under that Presidency." One would have imagined that this was a final closing of the testamentary career which had commenced. It seemed that wills must thenceforward be mere waste paper. If they altered the course of succession pointed out by the Hindú law, then they were to have "no legal effect." If they did not alter it, then the law would operate without their aid. This dilemma was acted upon for many years. But in 1851 the question was raised again before the Ṣadr Court, in a case precisely fitted to settle it. A man had, by a document which was strictly a will, diverted his property from one who was undoubtedly his heir to a stranger. On appeal the Madras Ṣadr Court upheld the validity of the will. The Court consisted of a single Judge who was not supposed to possess any exceptional skill in Hindú law. He rested his decision upon a Bengal case, and upon the opinion of the Paṇḍits. The Bengal case could be no authority in Madras, whose law was confessedly different upon the very point in dispute. The Paṇḍits afterwards alleged that they had misunderstood the question which was put to them, and supposed they were asked as to the validity of a gift *inter vivos* followed by possession, and not as to the effect of a disposition to take effect for the first time after death. The decision was appealed against, and was affirmed by the Privy Council. Their Lordships admitted that testamentary instruments were unknown to ancient Hindú law, and declined to lay down any broad rule as to the extent to which they might be valid in the Presidency of Madras. But they gave effect to this particular will; apparently on the ground that the opinion of the Paṇḍits had been in its favour and that two successive Judges, who seemed to have taken a great deal of pains in the case, had confirmed that opinion.

Oddly enough the matter was not even then at rest. The question came again before the Ṣadr Court in 1861, when the Judges, with more logic than subordination, decided that the ruling of their own Court in 1851 was as bad as it could be, and that of the Privy Council was no better, and flatly refused to be bound by its authority. Several similar decisions followed, none of which could be made the subject of appeal, and wills appeared again to be in a bad way. But on the 15th August 1862 the Courts were amalgamated, and another will-case came before the new High Court. Respect for the Privy Council had now resumed its place as an element of decision. The conflicting judgments were criticised from a chronological point of view, the mutiny was quelled, and wills in the Madras Presidency are now placed on as firm a footing as they are in Bengal. And so an important social revolution was effected by a combination of chances, at least as unlikely as those which brought about the torpor to which Mr. Kinglake ascribes the Sebastopol expedition.

The result, then, of this long discussion seems to be that two problems press for a solution. We want to know what the law of the people really is, and what they wish it to be. The first presents little difficulty. The most important law-treatises are at present translated, and all others of admitted authority, such as the Smṛiti Chandriká and the Sarasvatî Vilása, should be published in the original with English translations interpaged. On collating these it would probably be found that the books of each school of law coincided in the main, but that they differed in minor particulars, and that each of them laid down various rules which would at once strike the mind as being obsolete or incapable of being enforced. A good many of these points, again, would be found to have been expressly adjudicated upon. Still a certain residuum of doubt would remain, and this ought to be made the subject of enquiry, by circulating questions to persons of learning—and experience, such as Judges, Native and European, Paṇḍits and others whose opinions would carry weight. The answers obtained might either be made the basis of legislative enactments, or might by their own force as *responsa prudentum* settle the law.

Some steps of this nature seem peculiarly necessary with regard to those parts of the country which are governed by unwritten local usage. It is to be feared that the Natives of such places have often been condemned to live under local usages, of which no one had ever heard till they arrived there in a decree from Madras. It is bad enough that the uniform administration of the law should be broken in upon by local usages, which really are known to the people, and which are cherished by them. But it is worse, when those local usages are invented for the people, and are distasteful to them. A commission to take evidence on the spot upon all matters of special usage, would not only get rid of the danger of palming off new traditions as old ones, but would also probably reveal the fact that many of the old traditions have become obsolete and unsuitable to the wants of the community.

The next point is a more difficult one. It is obviously impossible to lay down rules as to the circumstances under which Judges should vary from the law which they are bound to administer. But there is no doubt that great room would be left for the spontaneous and unconscious legislation of the people, if litigants were always shut out from taking in appeal points of local or national law, which they had not taken in the original Court. For instance, the Malabar law does not allow of a suit for division, and if such a suit were brought, and the defendant took the point, he ought to have the benefit of it. But if he simply denies that the plaintiff is a member of the family, that amounts to a waiver of his own legal right to remain under all circumstances undivided, and I cannot see why the Court should force upon him the benefit of a law, which he is willing to dispense with, or of whose existence he is not aware. Of course it would be completely different where the law was one of those broad principles of jurisprudence, which every Court, in every stage of proceedings, ought to maintain. As, for instance, where the action was brought upon an immoral or illegal contract.

Our main reliance, however, for all radical changes, must be upon direct legislation. If enlightened Natives, who know the feelings and wants of their countrymen, and especially if those Natives who are members of the respective Legislative Councils, would come forward boldly and advocate those reforms which their altered social state renders necessary, they would confer incalculable benefits upon India. A measure for extending the power of Natives to make wills and to dispose of their self-acquired property has been introduced into the Madras Council by the Hon. V. Saḍagópáchárlu, and is a step in the right direction. A few more such measures would go far to release the Natives of India from the shackles with which an antiquated law has entangled them.

The third rule which I have suggested, viz., that Natives should be allowed to adopt the legal status of their conquerors, is one wholly unknown to our present system, yet its advantages are obvious and it is difficult to see what objections can be urged against it. Upon merely political grounds it is plain, that an identity of law would be one of the strongest bonds of union between the two races, and would go far to prepare the way for an identity of religion. On social grounds it is also plain, that our system of law, which is framed so as to give the greatest possible liberty to the individual, which removes all restrictions upon the transfer of property, which furnishes to every man the strongest possible motives for growing rich, while it supplies him with every facility for doing so, must be much better adopted to the wants of modern society than the Hindú law, whose essence is a scheme of communistic bondage. It is also plain, that although we have undertaken not to force our laws upon our subjects, there can be no reason why we should not allow them to adopt those laws if they choose to do so. If they do not avail themselves of the permission, at all events no harm would be done. But if they do, and to the exact extent that they do, there would be an immediate benefit.

I am inclined to think that even at first a considerable number would be willing to avail themselves of the option. All those classes who have no law, or no ascertained law, such as Jews, Armenians, and Parsees would probably at once accept the status of an Englishman, and feel a pride in doing so. So would those Native Christians, whose wealth and social position made the law by which they were governed a matter of any interest to them. In time, though perhaps not at first, their example would be followed by Natives who were founding their own fortunes by trade, professions, or official employment. In dealings with Hill-tribes and others, who appear to have no system of their own, the law of England might be tacitly introduced. Indeed we might go further and lay it down as a rule, that the English law should apply to all persons, and in all cases, where no recognised Native law appropriate to such persons applied.

Two great advantages, form a merely legal point of view, would arise from such an enactment. First, it would supply the want which has been so much felt, of a *lex loci*, capable of ready application in all cases not governed by Native usages. In the next place, the necessity of applying English law in India would probably compel many improvements in it, of which it is readily susceptible, and which alone are wanting to make it nearly perfect.

I am aware that the mere suggestion of introducing English law, at once draws forth an outcry from persons of every shade of intellect, from that of Mr. Bentham to that of Mr. Dickens. But those who know anything of the subject will at once see the emptiness of such an outcry, when directed against English law in India. Most of the sound objections to English law arose from its procedure, not from its principles. But in India the principles only, and not the procedure would apply. For instance, the system of common-law pleading was defective in giving neither party sufficient notice of the case which he had to meet, and in exposing both to the chance of being tripped up by the most technical objections. Again, the double system of Law and Equity, each engaged in obstructing and supplementing the other, was, and still is in England, a very great abuse. The delay and uncertainty of law-proceedings arose very much from the same sources, while the expense of a suit was traceable, not only to the causes just mentioned, but also to the fact, that the client had always to pay two different sets of professional men, each of whom had to be highly remunerated, and neither of whom was competent to conduct the cause by himself. Now as Indian procedure is exclusively governed by statute, none of these evils would arise from the extension of English law to the Mofussil.

No doubt many substantive principles of English law are objectionable in themselves. For instance, the highly artificial system of real property law and conveyancing; the distinctions between freeholds and leaseholds, between deeds and simple contracts; the twofold system of succession to property; all these portions of our English law originated in causes which have long since ceased to operate even in England. No scheme for grafting English law upon Indian jurisprudence would be perfect, which did not prune away these excrescences. Such a task would be worthy of a great legislator, and when his work was accomplished, he would probably before long find the fruit of his labours transplanted to British soil. Perhaps India may be destined in some measure to repay England for the lives which have been lost in the East, by setting her the example of bolder and more enlightened legislation than Westminster has as yet attempted.

No doubt many difficulties might be suggested as to the mode in which English law could be reconciled with Native religion, and as to the hardship resulting to vested rights.

But neither of these difficulties are of much weight. For instance, a Hindú who elected to be bound by English law should not be allowed to dismiss his wife except by the legal process of divorce, nor to marry another while she was alive and united to him. But the marriage ceremony would be performed, and its validity decided according to the rules of his own religion. So a Hindú adoption has at once a religious and a civil aspect. For religious purposes it would remain. For civil purposes it would cease. An anglicised Hindú who adopted, would have a person to perform his funeral ceremonies, and would, no doubt, obtain all the privileges in the other world which an adoption has hitherto procured. But his adopted son would be in exactly the same position as a person adopted by an Englishman or a Muḥammadan, and would possess no right of succession to his property. On the other hand no injustice would be done to him, as his adoptive father might provide for him amply by settlement or will, and the friends of the boy could always make it a condition precedent to his adoption, that such a provision should be made.

Again, with regard to vested interests, no insuperable obstacles to a fair arrangement would arise. To take the two last instances. A Native, who had already a plurality of wives, would continue to be their lawful husband, and would remain liable for their maintenance. A son, adopted previously to the change of legal status, would be treated to all intents and purposes as if legitimately born*(a)*. One of several undivided brothers abandoning the Native law, would be dealt with exactly in the same manner as a partner quitting his firm. He would have to take his own share by division, and would (in the absence of a special agreement to

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(*a*) Except, of course, in the case of a son being subsequently born to his adoptive father, when the adopted would only take one-fourth of the share of the natural-born son. See *Regular Appeal No.* 51 *of* 1861, 1 Mad. H. C. Rep. 45.

the contrary) remain personally liable for all family-debts contracted before division. Where the person adopting English law had undivided sons, they should be allowed a fixed period to signify their dissent, and to demand their share of the family property. If no dissent was signified within the specified time, then their status should be the same as that of the father. After-born sons would, of course, be allowed no option. In all cases, change of status should be formally registered, and publicly announced, and when once made should be absolute and irrevocable.

Little need be said upon the fourth rule. (See ante, p. 4) The Codes of Civil and Criminal Procedure, which have been passed within the last four years, have placed the practice of our Courts upon a footing which, for simplicity, cheapness, expedition, and adaptation to the discovery of truth, seems to me to be very far in advance of the system which prevails in England. The Penal Code too, though in some respects deformed by overlegislation, is on the whole a wonderful monument of industry and accuracy, and of language at once simple and clear. Under the influence of these improvements, we no longer witness such grave comedies as that of a muftí, first acquitting a prisoner because the only evidence against him was a single woman, and then joining in his conviction, on the hypothesis that the single woman might have been two men.

Much however still remains to be done. For instance, our whole testamentary procedure requires to be remodelled. It is inconceivable why the Letters Patent constituting the new High Courts should have swept away the Common Law and Equity Procedure, and have retained the old Ecclesiastical Procedure, which is infinitely worse than the other two. Not only is that system cumbrous and complicated in itself, and framed with reference to a secret mode of taking evidence which has long since been abolished, but it is singularly difficult really to ascertain what it is. The works upon Ecclesiastical Law are not in general written by lawyers, and are so faulty in their arrangement that the point which is wanted can hardly ever be found. What makes this blunder in the Letters Patent the more inexplicable is, that a new and simple system of procedure had been lately introduced into the Probate Court in London, which could with the greatest ease have been transferred to the Indian Courts. As it is we are left to grope through the Cimmerian gloom of Oughton and Gibson, Rogers and Burns, and are denied the benefit of the light which streams from that judicial luminary Sir Cresswell Cresswell. The mind is still perplexed with libels, condidits, and citations, personal answers, negative issues and responsive allegations. A man who in the year 1863 wants to say that John Brown made his will a month ago, is forced to use the following piece of monkish jargon.

A business of proving in solemn form of law the last will and testament of John Brown, prosecuted by William Brown his son against James Brown the father of the deceased.

"On which day Thompson in the name and as the lawful Proctor of the said William Brown and under that denomination exhibited the true and original last will and testament of the said John Brown deceased, bearing date, &c. &c., and by all better and more effectual ways, means and methods, and to all intents and purposes in the law whatsoever, which may be most beneficial and effectual for his said party, said, alleged, and in law articulately propounded as follows, to wit, &c. &c. And this was and is true, and so much the said James Brown, the other party in this cause, doth know, or hath heard, or in his conscience believes, and hath confessed to be true; and the party proponent doth allege and propound every thing in this and the subsequent articles of this allegation contained, jointly and severally."

Another point of great importance is, that every legislative improvement, which is introduced in England, should be extended to India, if suitable. This is more especially necessary in regard to mercantile law. British merchants ought to be able to feel that their obligations in every part of Her Majesty's dominions are governed by the same principles; and it is essential to them that their counsel in London should be able to advise them with as much safety as to the validity of a contract made in Calcutta, as if it had been made in Liverpool. Yet many most important statutes, such as the Bills of Lading Amendment Act, and the Mercantile Law Amendment Act, have never been extended to India. In all such cases the law of the two countries begins to diverge, and the decisions of the English Courts cease to be guides for the Indian Judges. Probably much of this shortcoming arose from the severe labour which was cast upon Sir Barnes Peacock during his last years of office, in carrying through the three great Codes of 1859 and 1860. His successor has got a comparatively clear field before him, and we may well hope that the great reputation which Mr. H. S. Maine has already gained as a scientific jurist, will be eclipsed by his achievements in practical legislation.

August 1863. J. D. M.

Contributions to the Botany of Southern India by CAPTAIN R. H. BEDDOME, *Officiating Conservator of Forests, with Plates.*

ANONACEÆ.

(New Genus) ATRUTEGIA (tribe Saccopetaleæ)

Generic Character—Sepals 3 small, petals 6, in 2 series æstivation valvate, outer ones nearly twice the size of the inner ones, ovate acuminated, nerved; inner ones obovate acuminate firmly cohering by their margins, torus subglobose, stamens indefinite, anthers sessile, connectivum large attenuated into a blunt point—ovaries numerous oblong, style long attenuated, stigma 2 clawed, ovule erect, solitary.

ATRUTEGIA WYNADENSIS (R. H. B.) an erect shrub, or small tree; leaves oblong acuminated, glabrous on both sides, 8 to 11 inches long by 3 inches broad, petiole 6 lines long, flowers axillary solitary, or solitary from small knots on the trunk, sepals rounded puberulous, outer petal puberulous on both sides, inner ones puberulous on the outside and glabrous within, but furnished on the inner face with a deep hairy channel round the upper portion torus ovary and style hairy (Plate No. 1.)

Rare. Wynad, in moist woods, 3,500 *feet elevation, in flower in January.*

"Unona pannosa" (Dalzell) is common in the Wynad and on the A′naimalais. "Cyathocalyx Zeylanicus" (Champion) not uncommon in moist woods on the A′naimalais "Guatteria coffeoides" (Hooker and Thomson), or a species closely allied to it, is a common tree in the Wynad: it yields a valuable fibre, as also does Unona pannosa. Orophea erythrocarpa, described by me from the A′naimalais in a former number of the Journal, I have also found in the Wynad.

MENISPERMACEÆ.

COCCULUS LAURIFOLIUS (D. C. I. 530) *A'naimalais up to* 6,000 *feet.*

SANYDACEÆ.

CASEARIA CORIACEA, (Thwaites Enum. Ceylon pl.), *on the higher ranges of the A'naimalais.*

TILIACEÆ.

GREWIA (LINN.)

GREWIA ACUMINATA, (R. H. B.) a small tree glabrous leaves oblong with a very long acumen, 4 to 6 inches long, by 2 inches broad, quite entire, glabrous, petioles 3 lines long, stipules small subulate, peduncles very short lateral or axillary 2-5 flowered, bracteoles minutes, sepals cinereo-pubescent on the outside. *Wynad (Devallicottah).*

OLACACEÆ.

MIQUELIA MEISN.

MIQUELIA DENTATA, R. H. B. [Jenkinsia Wallich] Diœcious. Twining glabrous leaves broad ovate acuminate with a slightly cordate base deeply and irregularly toothed to the apex about 8 inches long by 4 inches broad, pedicels lateral bearing 1-5 slender umbelliferous pedicels perianth monopetalous, tube short, segments 4, male stamens 4 joined at the base and alternate with the segments of the corol, rudiment of ovary bifid female no rudiment of stamens, fruit oblong obovate on a short pedicel slightly puberulous. *A'naimalais,* 2,000 *feet.*

ANACOLOSA (BLUME.)

ANACOLOSA DENSIFLORA, (R. H. B.) Arboreous young branches terete, leaves alternate glabrous and shining short petioled oblong rounded at the base, attenuated into an obsolete point at the apex pale green 4 to 6 inches long by

1½ to 2 broad, petioles 3 lines long, flowers fascicled in dense axillary, heads, from small knobs on the branches, pedicels 7 to 20 about 3 lines long, flowers fragrant pale yellow petals densely villous on the inside, reflexed at the apex, filaments very short glabrous or furnished with a few hairs disk lobed petals about 3 lines long by 1 line broad. (Plate No. 2.)

Rare. A lofty tree, dense moist woods on the A'naimalais at 2,000 feet elevations.

AURANTIACEÆ.

CLAUSENA INDICA, (Oliver Mon. on Aurantiaceæ Linn. Journal) [which is "Bergera nitida" of Thwaites Enum. and "Piptostylis Indica," Dalzell in Hooker's Journal of Botany, Vol. VIII, p. 33.] *Common on the A'naimalais.*

PARAMIGNYA ARMATA, (Oliver l. c.) [which is "Anthromiscus armatus" of Thw. En.] *A'naimalais, Wynad, Travancore hills.*

GUTTIFERÆ.

CALOPHYLLUM BRACTEATUM, (Thw. En. Cey. pl. p. 51.) This is the poon spar tree common in all our western ghât forests, erroneously entered in catalogues as "C. angustifolium."

SAPINDACEÆ.

NEPHELIUM (LINN.)

NEPHELIUM STIPULACEUM, (R. H. B.) Arboreous polygamo-diœcious leaves abruptly pinnate, leaflets 2-3 pair subopp. the lower pair at the base of the petiole small obliquely curved, and stipule-like, others oblong very obtusely pointed, slightly attenuated at the base glabrous, panicles axillary and terminal, together with the calyx and ovary slightly pilose; stamens 6-8; ovary 2 lobed 2 celled stigma 2 lobed, fruit oval, the size of a large gooseberry densely covered with weak prickles, seed oblong half covered with the succulent aril, testa brown, cotyledons very large fleshy—leaves 6-10 inches long, leaflets 3-4 inches long by 2-3 broad. *A middling-sized tree, A'naimalais and Wynad, up to* 3,500 *feet elevation.*

NEPHELIUM ERECTUM, (Thw. En. p. 57). *A'naimalais and Wynad.*

HARPULLIA IMBRICATA, (Thw. En. p. 56) [" Otonychium" Blume, " Streptostigma" Thw.] *A'naimalai hills, moist woods,* 2,000 *feet. Common.*

MELIACEÆ.

LANSIUM (RUMPH)

LANSIUM A'NAIMALAIENSE, (R. H. B.) Arboreous leaves unequally pinnate 6-9 inches long; leaflets 3-5 elliptic with a blunt acumination attenuated at the base entire glabrous 3 to 4 inches long, 1½ to 2 broad, flowers in axillary spikes calyx 5 cleft segments imbricate, petals 5 subglobose imbricate staminal tube obsoletely 10 cleft; anthers 10, two celled alternately shorter ovary strigose sessile 3 lobed, 3 celled cells, 2 ovuled style obsolete, stigma obtusely 3 lobed fruit size of a large grape, 2 celled 2 seeded; seed arillate embryo peritropal, radicle pubescent. (Plate No. 4.) *A'naimalais moist woods* 2,000 *feet (" Nemedra Nimmonii" Dalzell Bombay Flora ? ?)*

BEDDOMEA SARMENTOSA, (Hooker f.) *Wynad, Nílgiris and A'naimalais.* (Plate No. 3.)

DYSOXYLON (BLUME.) There is a large undescribed tree of this genus on the A'naimalais, (moist forest 2,000 feet) I have however only procured it in fruit. " Fruit round a little larger than a billiard ball, yellow when ripe covered all over with rough tubercles, slightly attenuated near the petiole, 3-4 celled 3-4 seeded. Seed solitary in each cell, attached by their whole inner face to the central placenta, bluntly three sided, hilum occupying the whole of one face testa thick deep reddish brown, radicle inverse near the apex between the large fleshy green cotyledons.

MILNEA APIOCARPA, (Thw. En. p. 60.) *A'naimalais.*

AMPELIDEÆ.

CISSUS (LINN.)

CISSUS ANAIMALAIENSIS (R. H. B.) Whole plant glabrous, leaves simple and trifoliate, common petiole 1 to 2 inches long, leaflets on short glandular petioles, ovate lanceolate with a very long acumination sharply serrated, lateral leaflets very unequal sided with an oblique base, 3½ to 4 inches long by 2 inches broad beneath prominently reticulated tendril many cleft furnished with minute stipules, inflorescence loosely cymose, pedicels shorter than the leaves. *A'naimalais,* 5,000 *feet elevation.*

BALSAMINACEÆ.

IMPATIENS (LINN.) (Sec. Scapigeræ Hooker and Thomson.)

IMPATIENS DENISONII, (R. H. B.) leaves ovate cordate with bristly crenatures furnished above with numerous weak hairs below glabrous, petioles generally shorter than the leaves—scapes much longer than the leaves flowers numerous, bracts small ovate, pedicels 1 inch long, sepals small ovate vexillum rather large broadly ovate vaulted, alæ with three broad spreading lobes, with a dense tuft of petaloid hairs above the conjunction of the lobes and furnished with a long filiform appendage which is entirely hid in the spur and extends its whole length—spur very long recurved capsule glabrous seeds numerous small. (Plate No. 5.) *On rocks and trees—Western slopes of the Nílagiris,* 3,000 *to nearly* 5,000 *feet elevation, very abundant.*

IMPATIENS ORCHIOIDES, (R. H. B.) Leaves ovate to orbicular with a deep cordate base, obtuse, bristly crenate furnished above with numerous weak hairs below nearly, glabrous very long petioled scapes about the length of the leaves 6-10, flowered at the apex, bracts ovate pedicels ½ to ¾ of an inch long, sepals small ovate, vexillum ovate, alæ with the lower petals produced into two long linear lobes, labellum ovate saccate without a spur, capsule glabrous seeds numerous brown minutely scrobiculate—flowers brownish-red. *Koondahs on trees in moist woods,* 7,000 *feet elevation, rare* (Plate No. 6).

CELASTRACEÆ.

GLYPTOPETALUM ZEYLANICUM, (Thw. En. Cey. pl. page 73.) *Common on the A'naimalais,* 2,000 *feet elevation.*

RHAMNACEÆ.

ZIZYPHUS WYNADENSIS, (R. H. B.) Arboreous unarmed leaves oblong to lanceolate attenuated at both ends acuminate shortly petioled glabrous and shining above, penninerved, beneath very finely reticulated and fulvo-pubescent on the nerves—young shoots and inflorescence fulvo-pubescent; flowers in dense axillary fascicles about the length of the petioles, styles 2, ovary 2 celled, disk hairy, petals 3 lobed sepals furnished with a prominent ridge down the centre of their inner face, anthers prolonged into a long connectivum. (Plate No. 7). *Wynád about Devallikottai, in moist woods, a lofty tree.*

CHAILLETIACEÆ.

MOACURRA GELONIOIDES, (Roxb.) *A'naimalais, up to* 4,000 *feet.*

LEGUMINOSÆ.

CROTALARIA ELEGANS, (R. H. B. Pulney Cat.) *A'naimalais, Travancore hills.*

CROTALARIA LUNATA, (R. H. B. l. c.) *A'naimalais.*

CROTALARIA ACICULARIS, (Hœrn.) *A'naimalais,* 3,000 *feet.*

Crotalaria dubia, (Graham). *A'naimalais teak-forests.*

Crotalaria humifusa, (Graham). *A'naimalais,* 5,000 *feet elevation.*

Crotalaria priestleyoides, (Benth. in Hook. Herb.) *A'naimalais,* 5,000 *feet elevation.*

Crotalaria multiflora, (Benth.). *A'naimalais,* 5000 *feet.*

Crotalaria triquetra, (Dalzell). *A'naimalais,* 3,000 *to* 5,000 *feet.*

Smithia setulosa, (Dalzell). *Wynád.*

Smithia capitata, (Dalzell). *A'naimalais, Coimbatore hills.*

Desmodium ormocarpoides, (D C.) *A'naimalai teak forests.*

Desmodium podacarpum, var. Gardneri. *A'naimalais, in moist woods,* (2,000 *feet.*)

Desmodium botuloides, (R. H. B.) branched from the base, stems angled adpresso-sericeous, leaves oblong acuminate glabrous above copiously adpresso-sericeous and pale beneath, 3½ to 4 inches long by 1½ to 1¾ broad, 2 large scariose lanceolate acuminate stipules at the base of the petiole—2 filiform stipels on the petiole a little below the leaf, racemes terminal minutely glandular pubescent pedicels short 2-3 together from lanceolate bracts, pedicels and calyx strigose, calyx 2 lipped upper lip ovate very slightly bifid at the apex lower deeply 3 cleft, legume linear 4 to 5 inches long glanduloso—hispid, 6-8 articulated, notched on both sutures, articulations long sub-elliptic. *A'naimalais, in moist woods, up to* 4000 *feet.*

Vigna Wightii, (Benth.) *A'namalais, Wynád, Common.*

Milletia. I have two new species, one from the Wynád and one from the A'naimalais: they are not perfect enough for description.

FLEMINGIA INVOLUCRATA, (Wall.) *Foot of the Karkur ghát, (Wynád).*

PTEROCARPUS SANTALINUS, (Linn.) (This has been erroneously described). Leaflets always 3 lower ones alternate or sub-opp., broadly ovate or orbicular deeply emarginate young parts and the under surface of the leaves slightly sericeous—inflorescence axillary or terminal racemed or panicled calyx slightly puberulous, stamens equally diadelphus. *North Arcot and Cuddapah hills. I have never found the tree on the Western side of our Presidency.*

BAUHINIA. I have a fine new species, a gigantic creeper with scarlet flowers, from the foot of the Karkur ghát. My specimens are not perfect enough for description, as I could only procure a few fallen flowers and some leaves.

PITHECOLOBIUM SUBCORIACEUM, (Thw. En. p. 100). *A'naimalais on the higher ranges.*

PITHECOLOBIUM GRACILE, (R.H.B.) Sec. Clypearia Benth.). Shrubby, leaves bipinnate, pinnæ 1 pair, leaflets membranaceous 3 pair shining short petioled, ovate lanceolate with a very long acumination, petioles nerves of the leaves and inflorescence minutely puberulous, 1 gland in the centre of the common petiole, secondary petioles with a gland near the base and one about a quarter of an inch below each pair of leaflets—panicles terminal many flowered flowers in small globose heads bracteated—legumes spirally twisted margin sinuate, about 4 seeded. *Wynád, moist woods on the Karkur gháts.*

CHRYSOBALANACEÆ.

ENTOSIPHON (R. H. B.) new genus.

Generic character: calyx tube infundibuliform, divisions 5 imbricate pilose lanceolate acuminate sub-equal, corol petals

5 ovate pointed imbricate equal a little shorter than the calycine lobes, inserted into the jaws of the calyx, stamen tube lining the inside of the calyx and connate with it to its base, densely hairy inside, fertile stamens 12-15 all on the side near the ovary, filaments glabrous twice the length of the calyx induplicate in æstivation anthers 2 celled bursting longitudinally, staminodes 5-9 very short pointed or rarely bidentate, ovary connate with the tube near the summit very hairy 2 celled, cells 1 ovuled ovules erect, style lateral glabrous except at the base, attenuated at the apex leaves glabrous lanceolate acuminated at both ends entire slightly undulate 8-9 inches long by 3 inches broad petiole 5 lines long 2 glands at the apex at its conjunction with the leaf, racemes puberulous shorter than the leaves, flowers subsessile 3 bracteated, outer bract large ovate lanceolate puberulous, 2 inner ones linear lanceolate.

ENTOSIPHON INDICUS, (R. H. B.) *Wynád, a tree* 3,000 *feet elevation in moist woods.* (Plate No. 8).

MELASTOMACEÆ.

OSBECKIA LINN.

OSBECKIA GRACILIS, (R. H. B.) shrubby erect slender stems nearly glabrous leaves distant narrow lanceolate acuminate slightly crenated 3 nerved; on both sides a few adpressed bristles; above much wringled when dry, 2½ to 3 inches long by ½ inch broad; petioles 1½ to 2 lines long, peduncles terminal or axillary 2-3 flowered, flowers large on short pedicels, calyx tube covered with a few distant bristles segments 5 deciduous ciliate and each terminating with a tuft of bristles, petals 4 obovate, stamens 8 anthers not beaked, style straight.

Sisparah ghát (Nílagiris).

OSBECKIA RETICULATA, (R. H. B.) a shrub on the higher ranges of the A'naimalais. (Description mislaid).

PACHYCENTRIA, (Blume). There is a fine new species grows on Rhododendron arboreum on the higher ranges of the A'naimalais: my specimens are not perfect enough for description.

SONERILA, Roxb.

SONERILA TENELLA, (R. H. B.) erect, leaves opp. 1-1¼ inch long 7-8 lines broad, ovate pointed finely serrate 3-5 nerved sometimes oblique and unequal at the base, above rather distantly covered with long whitish hairs, below nearly glabrous, lower pair distant petioles 4-8 lines long channelled peduncles 1-3 flowered glabrous anthers cordate acuminate capsule glabrous.

A'naimalais 3,500 *feet elevation (allied to S. Arnottiana. Thwaites.)*

SONERILA ACAULIS, (R. H. B.) leaves radicle ovate with a cordate base slightly crenate with bristles in the crenatures above furnished with distant thick white hairs which rise from white spots, below frosted with a few hairs on the nerves at length glabrous on both sides 2½ to 7 inches long by 1¼ to 5 broad petioles long glabrous, scapes the length of the leaves with 6-20 recurved short pedicels near the apex calycine segments small acute pedicels and calyx furnished with a few gland tipped hairs petals oblong to ovate acuminate, anthers narrow cordate yellow, style length of the stamens, stigma obtuse papillose, flowers pink.

A'naimalais moist rocks, 3,000 *feet.*

Sonerila rotundifolia, (R. H. B. Madras Journal) *is also found in the Wynád.*

MYRTACEÆ.

EUGENIA LINN.

EUGENIA GRACILIS, (R. H. B.) arboreous young shoots puberulous leaves petioled lanceolate acuminate of both ends glabrous shining above, 3-4 inches long by 1 to 1¼ broad, petioles 4 lines long, pedicels long slender (12-16 lines long) axillary solitary, or from short peduncles which are axillary or supra-axillary, pedicels and calyx puberulous, 2 small bracts at base of calyx, petals 4 ciliate twice as long as the lobes of the calyx white, ovary 2 celled ovules 6-9, fruit oblong about the size of a sparrow's egg.

A small tree: A'naimalais, banks of streams, 3,000 to 4,000 *feet.*

EUGENIA WYNADENSIS (R.H.B.): leaves oblong lanceolate with a long blunt acumination, when old quite glabrous on both sides, young leaves and ramali and inflorescence densely fulvo-tomentose, peduncles supra axillary much longer than the petioles; calycine lobes 4 lanceolate acuminate a little longer than the corol. bracts 2 linear much longer than the sepals, leaves 3-3½ inches long by 1-1¼ broad, petioles 3-4 lines long peduncles 6 lines long.

Wynád in moist woods, 3,500 *feet elevation, a shrub or small tree.*

CUCURBITACEÆ.

TRICHOSANTHES LINN.

TRICHOSANTHES ANAIMALAIENSIS (R. H. B.) : leaves 3-5 lobed very scabrous above, pubescent beneath, irregularly and deeply serrated; 4-5 inches each way, female flowers racemed furnished with large glandular lacinate bracts, sometimes solitary or 2 and then axillary with a lanceolate bract, stigma 3-4 cleft, sterile filaments 3 towards the base of the tube. Male flowers with a larger and more lacinate calyx, filaments 3 (rarely 4) distinct inserted on the gibbous part of the tube, anthers united corol very hairy on the inside, tendrils 2-3 cleft, flowers white berry globose.

A'naimalais, moist woods up to 4,000 *feet.*

BEGONIACEÆ.

BEGONIA LINN.

BEGONIA MINIMA, (R. H. B.) (Section Diploclinium.) Leaves radicle rhomboid ovate to cordate acuminate bristly crenate long petioled furnished above with a few weak hairs beneath glabrous pellucid dotted; scapes longer than the leaves, with one leaf near the base, peduncles dichotomous or alternate bracteated, several flowered, male flowers 4 petaled, 2 inner petals narrower than the outer ones, female flowers 5 petaled, capsule 3 winged. (Plate No. 15.)

On moist rocks Devallicottah (Wynád) in moist woods.

BEGONIA RENIFORMIS, (R. H. B. Madras Journal). As the name " reniformis" has already been given to a species of Begonia, this should be altered to " B: Anaimalaiensis."

CRASSULACEÆ.

KALANCHOE RITCHIEANA (Dalzell) *on moist rocks, A'naimalais,* 8,000 *feet elevation.*

LORANTHACEÆ.

LORANTHUS CLEGHORNII, (R. H. B.) glabrous, leaves opp. ovate very obscurely nerved coriaceous 2½-3½ inches long by 1½ inch broad, racemes axillary or terminal, many flowered, pedicels very short with a small bract embracing the calyx, calyx not exceeding the ovary entire or nearly so, corolla straight glabrous, ventricose at the base equally 4 cleft to below the middle, segments cuneate linear, berry oblong, flower deep dull orange colour.

On Rhododendron arboreum A'naimalais higher ranges.

RUBIACEÆ.

ACRANTHERA ZEYLANICA, (Arnt. in Ann. Nat. His. III, **21**.) *Moist woods on the A'naimalais,* 4,000 *feet elevation.*

ARGOSTEMMA COURTALLENSE, (Wight) (A. connatum Dalzell) : *common on the A'naimalais.*

ARGOSTEMMA VERTICELLATA, (Wall) (A. glaberrimum Dalzell) *A'naimalais* : *rare.*

OPHIORRHIZA LINN.

OPHIORRHIZA FALCATA, (R. H. B.) Erect every where glabrous leaves lanceolate tapering at both ends acuminate, very pale beneath stipules large subulate to triangular, cymes axillary and terminal long peduncled with about 3 reflexed second divisions, 2 of which are generally 2 parted bracts large falcate, calyx minute, flower buds angled, corol gibbous at the base and contracted below the segments glabrous outside, hairy in the jaws above the anthers.

A'naimalais moist woods 3,000 to 4,000 *feet elevation.*

HEDYOTIS GLABELLA, (Heyne in Herb. Hooker) *A'naimalai teak forests.*

HEDYOTIS BUXIFOLIA, (R. H. B.) Shrub, glabrous branches terete, leaves short petioled 4-6 lines long 3 lines broad, broad ovate shining glabrous, nerves obscure, very coriaceous, margins recurved stipules broad sheathing connate at the base, divided into filiform teeth, ciliate on the margins and with a line of hairs down the centre, calyx cup shaped with 4 erect teeth slightly ciliate, corol villous in the mouth and on the segments, filaments included or exserted, anthers oblong style longly exserted, peduncles terminal or in the upper axils 3 lines long 3 flowered flowers nearly sessile bracts filiform ciliate, capsule splitting into 2 bony cocci seeds numerous. *A'naimalais, higher ranges.*

HEDYOTIS HIRSUTISSIMA, (R. H. B.) shrubby leaves 1½ to 2 inches long short petd. ovate lanceolate, nerves numerous prominent, mucronately acuminate, both sides of the leaves and panicles densely and adpressedly hirsute with yellowish hirs, stipules ovate, pectinately pinnatifid very hairy, panicles axillary corymbiform few flowered much shorter than the leaves, bracts linear leaf like, calyx deeply 4 cleft segments lanceolate acuminate very hairy, corol tube long very hairy outside and bearded within, seeds numerous.

Kundas. (Nílagiri) 7,000 *feet elevation in moist woods.*

GRUMILEA LONGIFOLIA, (R. H. B.) *A shrub A'naimalais,* 3,000 *feet (description mislaid).*

SERISSA Comm.

SERISSA FRAGRANS, (R. H. B.) Shrub 10-12 feet, leaves glabrous oblong or oblong lanceolate acuminate attenuated at the base, 3-4 inches long by 1¼ to 2 inches broad petioles 3 lines long peduncles terminal very short 1-5 flowered, pedicels 2 lines long flowers tetramerous calyx slightly 4 toothed corol infundibuliform minutely papillose outside villous within the tube, fruit oblong, flowers white fragrant (the outer portion of the lobes of the corol of Serissa is of a thin membranaceous text and is folded over the thick fleshy portion in the bud, the edges of the fleshly part being valvate) (Plate No. 9).

Western slopes of Nílagiris. Rare.

SERISSA GLOMERATA, ("Serissa Gardneri" Thw., "Dysodidendron glomeratum" Gardn., "Saprosma Indica" Dalzell) *very common in moist forests western side of the Presidency.*

SERISSA WIGHTII, (Lasianthus fœtens" Wight. "Dysodidendron Wightii" Gardner) *common in moist woods, A'naimalais, Nílagiris.*

VALERIANACEÆ.

VALERIANA NECK.

VALERIANA MICROPHYLLA, (R. H. B.). Stem erect striated nearly glabrous, tufts of hair at the insertion of the cauline leaves and the divisions of the corymb radicle leaves on longish petioles pinnate below, pinnatifid at the apex, leaflets slightly hairy and ciliate, at length glabrous narrow linear to filiform ¼ to ½ inch long by 1 to 2 lines broad often bearing small linear auricles at the base cauline leaves conform to the radicle, but sessile and stem clasping, corymb small compact. *A'naimalais,* 6,000-8,000 *feet.*

MYRSINACEÆ.

ARDISIA LINN.

ARDISIA SERRATIFOLIA, (R. H. B.). Shrubby, leaves short petioled narrow lanceolate attenuated at both ends, long acuminated very sharply serrated 5 to 8 inches long, 1 to 2 inches broad, nearly glabrous above—young branches petioles and under surface of the leaves rufo-tomentose peduncles axillary pedicels 2-5 slender ½ inch long glabrous, calyx pubescent petals gland dotted, style long slender.

A'naimalais, moist woods up to 3,000 *feet.*

EBENACEÆ.

DIOSPYROS INSIGNIS, (Thw. En. p. 180). *Moist woods on the A'naimalais,* 2,000 *feet.*

SYMPLOCEÆ.

SYMPLOCOS JACQ.

SYMPLOCOS UNIFLORA, (R. H. B.) arboreous, glabrous leaves coriaceous short petioled ovate lanceolate 1 to 1½ inch long, ¾ to 1 inch broad, serrulate glabrous shining, peduncles axillary solitary from ½ as long to nearly as long as the leaves slender, berry cylindric 3 celled.

A'naimalais, a small tree, 5,000 *feet.*

SYMPLOCOS ROSEA, (R. H. B.) Shrubby, leaves oblong to lanceolate slightly attenuated at the base and with a longish sharp acumen, mucronately serrulated glabrous 4 to 6 inches long by 1½ to 2½ broad petioles 4 lines long, young branches petioles and inflorescence puberulous, racemes axillary longer than the petioles, bracts bracteoles calyx and fruit puberulous, berry sub-cylindric 3 celled, flowers rose-coloured.

A'naimalais, moist woods, 2,000 *feet.*

ASCLEPIADACEÆ.

CEROPEGIA LINN.

CEROPEGIA MACULATA, (R. H. B.) root fibrous, twining stems terete glabrous maculate, leaves ovate acuminate maculate and minutely punctated glabrous, furnished with a minute gland on the lamina just above the insertion of the petiole 2½ to 3 inches long by 1½ to 2 inches broad, petioles very minutely pilose channelled 1 inch long; peduncles a little shorter than petioles glabrous pedicels umbelled 7-10 as long or longer than peduncles, sepals subulate corol dull greenish purple limb ⅓ of the whole, segments ciliated, exterior lobes of stam. cor. of the same length as the inner ones alternate with them and bifid to the base, follicles terete slender.

A'naimalais in moist woods 2,000 *to* 3,000 *feet.* In appearance much like C. candelabrum Linn (which is C. intermedia of Wight): the formation of the st. cor. is however very different.

CEROPEGIA ENSIFOLIA, (R. H. B.) root tuberous, stem twining glabrous, leaves very narrow linear tapering at the apex, mucronate, above a few adpressed hairs, below pale glabrous, 4-7 inches long by ¼ inch broad, very short petioled: peduncles axillary from ½ as long to nearly as long as the leaves, pubescent furnished with several ovate pointed bracts at the apex, umbelliferous, bearing several flowers on simple pedicels and a second peduncle which is again umbelliferous or sometimes much elongated and paniculate, pedicels pubescent, calycine lobes glabrous subulate half the length of the ventricose base of the glabrous corol, segments of corol as long or longer than the tube, exterior lobes of st. cor. short emarginate ciliate, alternate with the inner long ligulate lobes, follicles long slender terete, flowers greenish white.

A'naimalais, hills, rocky places at 2,500 *to* 3,500 *feet elevation.*

CEROPEGIA FIMBRIIFERA, (R. H. B.) root tuberous, stem erect, minutely pubescent leaves sub-sessile narrow ensiform tapering to the apex minutely ciliated, above pubescent, beneath glabrous except on the midrib and minutely frosted, peduncles axillary short nearly glabrous about 4 flowered, flowers opening in succession, pedicels about as long as peduncles, furnished at the base with a few subulate bracts, calyx segments subulate acute ¼ length of corol tube, corol tube narrowed upwards (but not ventricose at the base) segments about the length of tube with tufts of numerous long purple gland tipped hairs between the segments, outer lobes of st. cor. short sharply bifid and ciliated, inner lobes long ligulate and adnate to the centre of the outer ones, follicles terete, flower tube greenish outside deep purple striated inside, segments pale greenish purple fringe deep purple leaves 5-6 inches long by 2-3 lines broad, ped. 6-8 lines long. (Plate No. 10.)

A'naimalai hills, rocky places, 3,000 *feet, rare.*

This is always a small erect plant in its wild state. Brought into a garden it becomes a creeper, the tufts of gland tipped : hairs are concealed within the corol until the segments expand : they then hang down like a fringe round the apex of the tube.

CEROPEGIA GRACILIS, (R. H. B.) root fibrous, stems twining glabrous, leaves short petioled ovate elliptic acuminate minutely ciliate, above furnished with a few distant short hairs, minutely pellucid dotted, beneath shining glabrous except on the midrib, peduncles longer than the petioles 2-5 flowered flowers very large tube short ventricose at the base segments longer than the tube, very narrow at the middle broader upwards outer lobes of the st. cor. short deeply bifid ciliate with long fine hairs, inner lobes alternate with them distant long ligulate.

A'naimalais, moist woods, 4,000 *feet, rare, allied to* " *C. oculata" Hooker.*

CEROPEGIA OCULATA, (Hooker). *A'naimalais, moist woods* 2,000 *feet elevation, common.*

GENTIANACEÆ.

EXACUM MACRANTHUM, (Arnt) *Pulney hills and A'naimalais on the higher ranges.*

(I have a new species of Ophelia from the A'naimalais, but I have mislaid the description and have no specimens now by me.)

PODOSTEMACEÆ.

DICRÆA Pet. Th.

DICRÆA ALGÆOIDES, (R. H. B.) fronds greenish black, compressed algæoid, floriferous at the base leafless outer involucre composed of 3 thick fleshy leaves 2 of which are equal in size and one is very small involucel entire pellucid completely enveloping the flower, staminodes 3 the centre one attached to the antheriferous filament or rarely wanting anther cells unequal, sigmas 2 subulate entire reflexed, pedicel of the flower elongating in fruit capsule 1 celled 8 ribbed.

A'naimalai Hills, on rocks, in streams and rivers up to 3,000 *feet elevation.*

MNIOPSIS Mart.

MNIOPSIS SELAGINOIDES, (R. H. B.). Rhizome small scale like stems erect 1-3 inches high terete succulent, naked with long filiform leaves towards the apex, or densely covered with thick hard triangular imbricated sheaths each of which is terminated with a long filiform leaf, leaves very caducous 2-6 inches long by ½ a line broad semiterete at the base, flattened upwards; flowers terminal solitary, involucre tubular, mouth 2 cleft, staminodes 2 stamens 3 monodelphous, stigmas 2 entire or 2-3 cleft, capsule smooth.

A'naimalai Hills, on rocks in beds of rivers, 1,500 *to* 3,000 *feet elevation.*

All the leaves of this species fall off long before the flowering season (December), but the scales or sheaths are persistent. The flowers are only on the apex of the stems furnished with these sheaths: the other filiform stems, which are destitute of scales, bear the same filiform leaves but no flowers.

ACANTHACEÆ.

STROBILANTHES, (Blume.)

STROBILANTHES ANDERSONII, (R. H. B.) shrubby 12 to 20 feet high, stems terete hirsute, leaves petioled ovate acuminate serrate, hirsutely pubescent on both sides, 4 to 9 inches long 2 to 4½ broad, petioles ½ to 2 inches long hirsute, peduncles axillary much shorter than the leaves flowers in dense bracteated heads, bracts large glabrous or slightly ciliated ovate obtuse calycine lobes narrow lanceolate ciliate corol glabrous large pale blue, stamens 4 unequal.

A'naimalais, moist woods, 5,500 *feet elevation.*

STROBILANTHES GRACILIS, (R. H. B.) shrub 18 feet high, stems terete glabrous, leaves sessile auricled at the base narrow lanceolate with a long acumination, attenuated towards the base, sharply serrated glabrous on both sides 4-6 inches long by 1-1½ broad panicles terminal or from the upper axils loose, many flowered glanduloso-puberulous flowers in distant pairs each furnished with a small lanceolate bract, calycine lobes linear lanceolate, corol lilac, stamens 4 unequal, capsule attenuated at the base acute one-third longer than the calyx.

A'naimalais with the preceding.

STROBILANTHES WARRCENSIS, (Dalzell) *foot of Karkur ghát Wynád.*

PROTEACEÆ.

HELICIA Lour.

HELICIA NILAGIRICA, (R. H. B.) glabrous, leaves broad ovate acute attenuated at the base, coarsely and sharply dentate with large sinuses, except near the base, prominently reticulated, racemes densely flowered much shorter than the leaves, pedicels generally 2 flowered with a minute bract at the base of the pedicel, hypogynous glands connate into a 4 crenated cup.

Western slopes of Nílagiris, 3,000 *to* 4,000 *feet elevation* (Plate No. 11.)

URTICACEÆ.

LAPORTEA CRENULATA, (Gand) *A'naimalais, Wynád.*

PELLIONIA HEYNEANA, (Weddell) *A'naimalais, Wynád.*

PROCRIS LÆVIGATA, (Blume) *A'naimalais.*

LECANTHUS WIGHTII, (Wedd) (Elatostemma oppositifolium (Dalz) *A'naimalais.*

BOEHMERIA PLATYPHYLLA, (Don et Ham.) (splizgerbera maccrostacha Wight) *A'naimalais, Pulnies(a), Nílagiris.*

OREOCNIDE INTEGRIFOLIA, (Wedd) *A'naimalais.*

MOROCARPUS LONGIFOLIUS, (Blume) (Conocephalus niveus Wight) *A'naimalais.*

Gironniera reticulata (Thw. En. Cey. pl. 268) *A'naimalais.*

(*a*) பழணிமலைகள்.

HYRTANANDRA, Miquel.

(Memorialis Ham. Weddell) (Pouzolzia in part Wight.)

HYRTANANDRA MACROPHYLLA, (R. H. B.) erect stems very hairy-leaves opp. or rarely alternate 3-7 inches long short petioled, ovate to lanceolate mucronate, entire, covered on both sides with adpressed hairs more dense on the under side, upper side minutely dotted, stipules broad ovate acuminate; terminal floral leaves small bract like sessile ovate with a very broad base and a long acumination flowers sometimes also in the axils of the larger leaves, male flowers 4 petaled ciliate fruit 2 winged ciliate.

A'naimalais, 3,000 *feet elevation.*

SANTALACEÆ.

PYRULARIA WALLICHIANA, (D C. Prod. XIV, 629.)

Sphærocarya Wallichiana (Wight), Wynád and Coorg.

EUPHORBIACEÆ.

CLAOXYLON LONGIFOLIUM? (Baillon) *A'naimalais.*

CLEIDION JAVANICUM, (Blume) *Tetraglossa (Beddome, Madras Journal) A'naimalais, moist woods,* 2,000 *feet,* (Plate No. 14.)

CROTON. I have a new species, a small tree from the Nallamalais, but my specimens are too imperfect for description.

CHÆTOCARPUS CASTANOCARPUS, (Thw. En. 275) *A'naimalais.*

DIMORPHOCALYX GLABELLUS, (Thw. En. 278) *A'naimalais, moist woods,* 2,000 *feet,* (Plate No. 13.)

DESMOSTEMON ZEYLANICUS, (Thw. l. c.) *A'naimalais, moist woods,* 2,000 *feet,* (Plate No. 12.)

AGROSTISTACHYS INDICA, (Dalzell) *A'naimalais and Wynád up to* 4,000 *feet.*

CYCLOSTEMON ZEYLANICUM, (Baillon.)

(Sphragidia Zeylanica " Thw. " Laneasagum" (Beddome, Madras Journal) A'naimalais, moist woods, 2,000 *feet.*

SCYTAMACEÆ.

AMOMUM LINN.

AMOMUM PIERARDIOIDES, (R. H. B.) roots furnished with long runners just below the surface of the soil, stems erect 3 to 5 feet high glabrous, leaves oblongo-lanceolate acuminate glabrous above minutely silvery seriaceous beneath petioles 4 to 6 inches long glabrous deeply channelled, sheaths ending in an obsolete ligula. spikes small 3 flowered scarcely peduncled rising from the runners at some distance from the stem ¾ hid in the earth so that the flowers only appear, outer bracts broad ovate, inner ones narrow lanceolate marcescent, calyx spathaceous opening on one side only sharply toothed, exterior border of the corol of 3 broad very membranaceous segments white, the superior segments ending in a horn-like process, lip very broad spreading crumpled sub-entire or slightly 3 lobed, middle lobe emarginate white with a streak of red and yelow down the centre, furnished with 2 flat spurs at the base which are slightly toothed and ciliate, filament nearly as long as the anther (½ an inch) crest of anther broad semilunar entire, stigma wedge shaped with a ciliate mouth scales of the germ 2 (1 inch long) truncated and fluted to receive the stigma, rarely 2 extra short apiculate ones are present capsule red 3 valved with nine shallow furrows 3 celled.

A'naimalais, moist forests, 2,000 *feet, fruit almost exactly lihe that of " Pierardia macrostachys."*

Allied to Amomum pulchellum, Thw. En. p. 318, and also to A. maximum of Roxb.

AMOMUM DEALBATUM, (Roxb.). *A'naimalais with the preceding.*

AMOMUM MURICATUM (R. H. B.). 3-5 feet high, leaves broad-lanceolate, almost sessile from the apex of their sheaths which end in an entire ligula, and are furnished with a knob-like gland at the base of the very short petiol leaves deep green shining, glabrous on both sides 12 inches long 4 inches broad, spikes (at first appearing as a globular head) short peduncled, radical, lower bracts small, pink, embracing the peduncle, upper ones crumpled turning brown before the flowers expand, calyx double, the outer one tubular, shorter than the inner, 2 cleft at apex, inner one 3 cleft; exterior segments of corol white to yellowish, lateral ones narrow, superior broad-ovate, not ending in a horn, lip deeply 3 parted lower lobe protruded and emarginate, 2 spurred at the base, yellow with a broad streak of red spots filament longish broad more than twice the length of the anther, anther-crest semilunar, very large, entire, yellow; scales of the germ 2 short and thick, the stigma rising up between them : capsule globular pink-coloured size of a greengage, concave at the top, beset with numerous stout prickles.

A'naimalais : moist forests, 2,000 *to* 3,000 *feet.*

Telugu Spells, translated by C. P. Brown, Esq., *late of the Madras Civil Service.*

[The Editor is indebted to the Deputy Registrar of the High Court of Madras, Appellate side, for the following translations, which were made by Mr. C. P. Brown, late Telugu Translator to Government, while he was Registrar of the Madras Sadr Court. The translations were made from two Telugu documents, which were referred to in the evidence of the prosecutor in a criminal case, F. 'A. No. 1435 of 1839, No. 22 of the Cuddapah Calendar for the first Sessions of 1839, and sent up to the Faujdári 'Adâlat in return to their precept of the 5th August 1839. The prisoner appears to have been indicted for the murder of a girl named Venkatasubbammá, whom he had enticed into his house and killed with a view of using her corpse as an ingredient in one of the following incantations. The murder took place on a Saturday evening and the body was found next day in a pagoda near the prisoner's house.]

TRANSLATION of book No. 3.

(This is a set of magic spells written in Sanskrit.)

"Salutation to the Supreme Brahma! Salutation to Gaṇeça! Om*(a)*! I salute Bhagavatí, who ruleth all magic arts: who draweth all the gods: and all the ghosts: all, all destruction. Swiftly seize on him, O thou who workest all things!"*(b)*

"O great Devadatta, O greatest of gods draw him. Mighty sprite (yakshiṇi) draw him. O thou science that sustainest Magic, draw him! Great Káli! Om! húm! mighty Káli of fevers! Om! Durgá, mighty Káli! Káli, Káli, O Káli jham Káli [here follow some unintelligible syllables] Karáli, Marali, strike strike him! [the next syllables are not in Sanscrit but in the Telugu language.] Fill thy mouth with blood! crow! crow! vomit blood. Stuff it! cram it! [the next words *pikku pikku, pili pili, &c.* are unintelligible] May his eyes turn in his head! May his bowels be twisted! may his heart shudder with horror! may his legs and joints totter! mangle him, break him like an unburnt potsherd,

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(*a*) As to this mystic ejaculation see Böhtlingk and Roth's Sanskrit-Wörterbuch I. 1122. The current explanntion—that it consists of three letters, *a*, *u*, *m*, combined and typifying the great divinities—appears to be erroneous.—*Ed.*

(*b*) The above lines and some others are so ignorantly written that the sense is a little obscure. *Devadatta*, the name now mentioned, is a fictitious name used in magic, like John Doe in law.

break him like paste of grain: in the fury of thy rage, with red eyes glare upon him! with thy red eyes destroy him utterly*(a)*! make him burst at the sight of thine eyeballs! Bhagavatí! mighty Mother! Kártta-vírya-jayí(*b*)!"

Let the above spell be reiterated a thousand times. The mode of using it will now be shewn.

Select a cemetery on the east of the village, and on a Sunday at night go and view it: walk seven times round the cemetery and stand at the north east of the ground: walk thence into the middle of the cemetery, turn to the west; walk seven steps backwards and then strip naked: take sacred white earth (vibhúti) in your left hand, bind it in a knot in a yellow cloth, with frankincense; which must be in the same cloth: conceal it in cotton: do not put it in their houses but hide it in any temple erected to the evil goddesses (Çakti). When the due occasion comes, draw the (Çakti-circle) magic figure of the goddess: and put a gold coin in her mouth with a slip of the tuḷasí plant*(c)*. Recite the prayer twenty-seven times pouring water over it.

[The next word *anturiyam* has no meaning and seems to be an error for *avasaram* "at the proper time."]

At the proper time bring water from the well and mingle the sacred ashes therein and recite the spell 27 times*(d)*. Then drink that water. If you drink it all he will die instantly.

(a) Literally, 'do his business.'

(*b*) All these are epithets of Káli or her fellow demons. I here omit some words as they are unintelligible. Karaka vati leka ori orivi, Rudra, bhau, e, orili orili, tarila tarila, harili harili, je je je &c. po po &c. &c. yum yum &c. hrím hrím &c. These words are well-known syllables used in magic.

(c) "The *Ocymum sanctum,* or sacred basil, venerated by the Hindús as a type of Vishṇu…… ……..it was used in the administration of oaths to Hindús, a few leaves with some holy water [tírtham] being held in the hollow of the hand of the deponent while the oath was repeated, and afterwards swallowed by him"—WILSON. The துளசி tuḷasí leaf is now always used in Madras in swearing both Vaishnavite and Çaivite witnesses.—*Ed.*

(*d*) This alludes to the number of constellations.

If you drink half and leave half, he will suffer dreadful pain. If you scatter the water he will remain unaffected.

The above is called the spell of Atakáru Durjana Káli. It is in the book called Saparam.

Take a bottle of toddy and a bottle of spirits with raw fish as a sacrifice. Then use this spell:

"Om námo Bhagavatí! Malayáḷa Goddess Mátanga [*i. e.* the Par'aiyan goddess] mighty in magic! who delightest in flesh and blood, who usest the rapid curse! let his five senses perish! O Power of Malayáḷa, smite him, smite him!" [here follow some unintelligible magic monosyllables Om! Om! hrím hram &c.]

Go to a potter's kiln and a washerman's hearth, and collect the ashes from each; with ashes from a cemetery: spread all three on the ground, and erect a pentagon*(a)*, and set the image thereupon with red rice, a red fowl, and red sandal wood, and red grain and red flowers. Cut off the fowl's head and pour the blood into a cup, and dip two arrows therein. Then bless the arrows nine times, and with one of them pierce the neck of the image, and with the other pierce its eyes. Then bury it on the north side.

Use the following spell: "O'm, Hrím, Goddess, destroyer of the Universe, with the long tongue*(b)*, who ridest on the buffalo. Om! bhúm! O'm! phaṭ! Sváhá(*c*)!"

The above spell is to be used as follows: get a black goat's milk on a Sunday, and sprinkle it twenty-seven times behind his house, [here a few words are unintelligible,] and your enemy shall lose the use of his hands and feet, and be afflicted with burning fever.

"Om hrím grim trím! Thou who destroyest the senses of others. Blessed Káli, armed with the spear and drum, who

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(*a*) The word *rati*, here inserted, seems to be an error.
(*b*) Káli is painted with a long tongue to lap up blood.
(*c*) The consort of Agni (ignis).—*Ed.*

delightest in red sandal, long-tongued, goddess of ghosts, and mighty in words ! O devour, devour my foe !

Húm ! phaṭ ! Sváhá !"

When you use this spell collect some ashes, utter his name and sprinkle the ashes [some words unintelligible this shall cause his death.

" Salutation to Gaṇeça. I salute the great Bhagavatí, queen of magic. [Here the first paragraph is repeated.]

" I worship the Par'aiyan Goddess who delights in flesh and blood, the dreadful Káṭeri(*a*). Eat ! Eat ! I hail the awful god Rudra(*b*)."

[Here some words are so ignorantly written that the sense cannot be made out.

Then follow the magic syllables as above.]

Mode of using the above charm. Take the grains called gram, pease, minumulu(*c*) &c. and mix them with rice, take a handful and make them into a paste with running water, and of this paste make an image. This you must place in

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(*a*) 'A forest-goddess whose power lies in inflicting diarrhœa.' Brown's Telugu Dictionary.—*Ed.*

(*b*) One of the names for Çiva. [Rudra, with whose name Benfey (Griechisches Wurzellexicon II, 6) ingeniously connects λύρα for λυδρα=*rudrâ*, appears in the Vedas to be identical with Apollo. Both gods bear the bow. Rudra knows a thousand medicines, and is the best of leeches. Apollo is called ἀκέσιος, ἀκέστωρ etc., and is father of Asklépios. Rudra fares through storm and clouds, and has his hair therefore made up in a mighty knot, whence he is called *kapardin* in the Rig Veda, 1,114,1,5 'he who hath his hair wound into the form of a shell' (*kaparda* 'cypraea moneta') Böhtlingk-Roth, II, 62. So Homer Il. 20, 39 calls Apollo ἀκερσεκόμης, and artists represented him with long, strong hair bound behind into a knot. As Rudra is called *vanku*, 'tortuose incedens' as god of the eddying storm, so Apollo is λοξίας (from λοξός obliquus)—which has nothing to do with the ambiguity of his oracles. As Apollo had a sister Artemis, so Rudra had Ambikâ. Apollo was called Smintheus (Il. 1, 39) from σμίνθος 'mouse', and was represented by the sculptor Skopas with a mouse at his feet. The mouse (âkhu or mûsh, μῦς, mûshikâ) was sacred to Rudra. See Kuhn, Zeitschrift für vergleichende Sprachforschung, III, 335, Kuhn, Herabkunft des Feuers, 202. Pictet, Origines indoeuropéennes, II, 476.—*Ed.*]

(*c*) A kind of bean grown on dry lands (Phaseolus Mungo)—Wilson.

a pit on the north side of the town and spread a swallow-wort leaf under it. Adore it with lamps, frankincense and a wave-offering, and sacrifice a cock. Fold it up in a leaf and bury it. This will effect your object. The charm must be repeated twenty-four times.

[Here follows a spell written in Sanskrit, Telugu and Hindústáni mingled. It is incomplete as well as erroneous and is scarcely intelligible.]

"Vijaya Rám! Bismilla Rahiman keheki bandu, chelmen gaddu," take seven lákhs of land [sic in orig.], nine lákhs of land, ten lákhs of land. Ráma Sanyási is my Teacher!

"Salutation to Brahma and my teacher! son of Çiva, Rudra's vehicle, noble Hanuman, Sañjíva Ráya, O Mother Añjaná, [mother of the monkey Hanuman.] I implore thee by the feet of thy mother, O Hanuman, to aid me. Hari om, nijayar."

Second Document.

[This is principally written in ancient Sanskrit verse, being an extract from the Sabara Chintámaṇi, a copy of which in my possession (vol. 2 p. 222) has enabled me to decipher some passages otherwise unintelligible on account of the ignorance of the transcriber.]

Sabara Chintámaṇi or Code of Destructive Magic.

The art of logic is chiefly studied in the North, and the religious rites (karmam) in the South: but the art of Magic came from the east and conjuring from Malayáḷam.

"Aum! hrím! hróm, hail, O Goddess of Malayáḷa, who possessest us in a moment! come, come!" On a Sunday(*a*) let the conjurer obtain the corpse of a girl, and at night let him place it at the foot of a tree: let him place it on the altar. Then let him use the abovesaid spells, one hundred times

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(*a*) It will be remembered that the body was found in the pagoda on a Sunday.

on a Sunday, and it shall be inspired by a devil, whom he must appease with flesh and wine to the full: offer him every thing he demands, and he will grant all you desire.

This spell is all powerful. It is called the virgin spell, and came from Malayáḷa.

I will now explain the mode used in the Karṇáṭaka country. This is taught in the Sabari, or code of necromancy.

In the midst of a temple sacred to Garuḍa (the hawk) *(a)* make white marks with earth, and erect a magic figure, and on a Sunday you must therein place an image, holding it in your left hand*(b)*.

" Therein sit with your face to the south and use the following spell—[which is omitted.]

But this spell must be delivered by the Teacher: unless delivered by him it is powerless and therefore I will not write it.

Another spell. " O Mighty queen of demons, who inhabitest the cemetery! come, approach! handmaid of Çiva, who devourest the buffalo." [Magic syllables, devoid of sense.]

Let the above spell be used for one day and night in a cemetery, and the awful goddess shall verily appear to thee in the shape of a buffalo.

This spell will give the power over ghosts. It is marvellous and most holy (loka-pávanam*(c)*).

(*a*) The name of a mythical bird: he is the Prince of Birds, the Foe of snakes, Vishṇu's vehicle, and a son of Kaçypa by Vinatâ. Immediately after his birth he terrifies the gods with his clear-beaming light: they take him for Agni and pray the latter for protection. When they find he is Garuḍa, they praise him as the Highest Being and name him Fire and Sun. Aruṇa, the Sun's charioteer (the personified dawn) appears as the younger brother of Garuḍa. Böhtlingk and Roth, from whose Dictionary, II, 694, the foregoing has been translated, conclude by observing that some phenomenon caused by light (*lichterscheinung*) obviously lies at the basis of this mythe.—*Ed.*

(*b*) The sense here is so far imperfect that it cannot be determined.

(*c*) Literally ' world-purifying.—*Ed.*

Take the white consecrated earth, and one Sunday night go into a cemetery, and continue three nights in prayer. The third night the goddess Mainamma shall appear to thee, and demand what is prayed for. The worshipper must make her promise to come to him whenever he desires it. Then let him tie up the ashes in a shroud and come away. Then he must smear the ashes over the cloth and form it into a wick: with which he must light a lamp filling it with oil, and this shall give us power over any one we wish to summon; and you may then release him.

I will now declare the Andhra Mantram [spell written in the Telugu language], which is mysteriously concealed in the Codes of Rites (Ágamas.)

On a Sunday you must obtain the body of one who has been slain in battle, and at night bring it to a burying ground. Then fasten a cord twenty cubits long to a peg and let this be fastened to the corpse and to a tree. Then you must by the force of spells compel the ghost of the deceased to appear.

The following is the spell to be used.

"O Mighty Hero, full of might and valour, approach approach, accept accept the sacrifice, accomplish, accomplish the work! húm! phaṭ!"

This is the mighty spell, which shall cause the ghost to approach. You must offer him flesh, &c. as a sacrifice, and whatever else he desires. This shall make the hero subject to our power.

Then take the two sorts of ashes already mentioned, and make the lamp. Then recite the spell as before, sitting with your face to the south and in a moment he will obey your power. A most marvellous rite throughout!

Use this spell regarding a corpse slain in battle bound with a cord (&c. see above), and use the said spell, which shall render the spirit subject to thee : then when you have occasion make the lamp as above directed, and the devil shall bestow all that is desired.

Spell. "Om ! Om ! hrím, Virgin goddess of black midnight, seize so and so ! Húm ! phaṭ !"

This spell is to be used repeatedly : and the goddess who rules the cemetery shall grant the prayer. She shall at thy pleasure bind him or draw him to thee. This is indubitable as the promise of Çiva.

End of the ninth chapter of the Magic Treatise named Sabari written by Nitya Nátha Siddha son of Párvati.

CHAPTER X.

I salute the awful man-lion who is marked with the spot of Vishṇu, lord of the world. I meditate on him in my heart and speak his name : and may it bear such fruit as it may.

Párvati speaks. Thou hast already declared the most awful spell that causes death.*(a)* Declare it to me O thou who art an ocean of goodness.

Çiva replied. In the Gauli*(b)* country is the fatal spell used ; the mortal spell is the easiest of all.*(c)*

On a dark night, O goddess, let the Gaula spell be used by remembering which you shall cause in a moment the death of your enemy. If devoid of this spell you contemplate such a deed, it will be fruitless as showers of seasand.

(*a*) This passage exemplifies the incorrectness of the copy now examined : instead of *dáraṇa* 'horrible' is written *dháranam*, 'a mystical verse or a charm,' from *dhar* tenere.

(*b*) Query Gauḍa, the ancient name of Central Bengal :—*Ed.*

(*c*) In this passage the original is unintelligible, and I have resorted to my own manuscript.

Spell :—" Om ! I salute Bhagavatí, goddess of midnight, who delightest in human flesh and blood : who bearest the form of darkness, seize on so and so as thy victim. Drink his blood, eat eat his flesh, then let him die. Húm, Phaṭ Sváhá."

Let this spell be used in a cemetery and on that night the goddess Káli shall visibly appear to thee. Then satiate her with sacrifices of flesh as far as lies in thy power in the place where the corpse was burnt and that night shall thy foe sink into hell.

This is the Káli spell: let it be used one hundred times, beginning from the 12th until the 14th day of the lunar fortnight, and Káli shall appear before thee. Then appease her with sacrifice, and she shall grant all thy prayer. Then you must require of her to appear whenever you desire her aid.

Let him then perform the rite with ashes and the lamp as already directed, and whenever he wishes it she shall appear to him and do all he wishes.

Otherwise: recite the spell inserting therein the name of thy foe.

Form a paste of human bones and recite over it one hundred times the proper spell; then let this be sprinkled on what the foe eats or drinks and he shall die in a week.

Further: the Malayáḷa mantra(*a*) is as follows. It is most potent. It is as follows.

" Om ! hram hram, glaum glaum, Swinefaced goddess: seize on such an one, seize him, seize him as a victim ! drink, drink his blood, eat, eat his flesh. O image of imminent death, Bhagavatí of Malayáḷa, hum, glaum, phaṭ, Om !"

Use this spell a thousand times and it shall be effective. Then specify the name of your enemy, strip yourself naked

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(*a*) *Mantra* here means a magical formula.

and recite the spell in the elder house*(a),* and it shall cause his death within a fortnight.

Procure the bones of a par′aiyan and say the spell over them on a Wednesday, and bury them in the house of your foe: his entire house shall die and he himself shall be left alive.

Form an image with wax in the form of thine enemy: take it in your right hand at night and hold your chain of beads in your left hand. Then burn the image with due rites: and it shall slay your enemy in a fortnight, and he shall sink into hell.

Read over this spell in the presence of the Mothers (*i. e.,* goddesses,) and say I will come when the time approaches. Then when you require their aid recite this spell a thousand times, whereupon the goddess will appear and certainly will do as thou desirest.

Recite it a thousand times in a cemetery and your enemy will perish in a fortnight.

Take a bone from a buryial ground, and recite the spell a thousand times over it, and throw it into your enemy's house; and it shall cause his ruin.

Then form an image of wax*(b),* touch it with your hand, recite the spell a thousand times, and burn it with mould procured from a funeral pile, and it shall cause the death of the enemy.

I will next explain the Karṇáṭaka process of causing death, invented by A′dinatha; which, O goddess*(c),* is infallible if recited in a cemetery.

(*a*) Jyeshthágáré means 'in the elder house,' but perhaps is an error; both manuscripts here coincide.

(*b*) Though this is written in Sanskrit verse the Telugu word *mainam* for wax is inserted.

(*c*) Throughout this chapter, which is in verse, the words O goddess, &c. are inserted to make the metre complete, and are needless in a translation.

"Om húm glaum, Ghost! who delightest in human flesh and blood, and eatest the honeyed cake; destroyer of thousands! devourer of numberless living creatures, devour so and so; devour him, drink his blood! eat, eat his flesh! Ha! hau, húm, phaṭ."

This supreme spell is to be recited in a cemetery; the sacrificer must be naked; he must stand on a shroud, and facing the south. In the wane of the moon he must commence it, and continue through the fortnight, reciting the spell in the order called The Dark Path. Then shall the queen of demons obey his call and come surrounded by her ghosts. She will ask him what he requires, and he must say, The death of my foe. She will graciously reply that she will bring it about. She will immediately undertake it.

Then let the sorcerer frame the name of his enemy into a spell, and thus bring about his death by reciting it one hundred times. Of this there can be no doubt.

I will next describe the Andhra mantras [or, spells potent in the Telugu country] which were composed by A′dinatha.

Spell: "Om hrím glaum, Lady Bhairava*(a)*, who destroyest the times of destruction, who art adored by hosts of potent devils; who joyest in human flesh and blood, approach approach, come come to me, húm, phaṭ, Sváhá."

This spell is to be used commencing with the name of Bhairava, and shall gain all power over spells. Repeat the name of your enemy and recite the spell a thousand times. Be he rich as Kubera (god of wealth) he shall sink into poverty.

This spell beginning with the name of Bhairava is to be recited: and when the proper time is come recite it with the name of the enemy. This is to be recited 1,000 times and it shall cause his death in a fortnight.

(*a*) Lit. 'Formidable', a name for Durgá:—*Ed.*

I will now state the spell used in the country of Ghurjara (Guzerat) composed by A′dinatha. This is a spell most potent to cause death. Let it be kept most secret.

Spell. (Same as given above with a mere variation in words and order).

Rule (same as above.)

Then offer a fowl with wine, flesh, &c., in a cemetery.

End of Chapter Tenth.

Charms used for vanquishing an enemy. Om nomo, &c., as above.

Salutation to Káli............as above.

Eat my enemy's flesh, drink his blood. Húm phaṭ, &c.

(Thus far is in Sanskrit—then follows, in Telugu).

Let this spell be recited 128 times, and throw a stone from the top of the house: it shall cause the death of your enemy.

Another spell. "Logic is chiefly used in the north, &c. &c.," see page 2.

(The remainder of this book is merely a repetition of the first pages. First comes the Keraḷa (or Malayâḷa) spell. Then the same pages are again copied to the end of Chapter Tenth).

True translations as far as the original is intelligible.

C. P. Brown.

Remarks on the Sanskrit Manuscripts in Madras by DR. GEORG BÜHLER, *Professor of Sanskrit in the Elphinstone College, Bombay.*(*a*)

THE Government of Madras has made praiseworthy efforts to bring under the notice of Orientalists and to facilitate the use of the splendid collections of Oriental MSS. in charge of the Board of Examiners. We now possess two volumes of a Catalogue Raisonné of these collections by the Rev. W. Taylor and the first part of an alphabetical catalogue by Kondasvámi Ayyar. The largest portion of these MSS. is in Sanskrit, and to that portion, as I cannot claim any knowledge of the Dravidian languages, I shall confine the following remarks.

The Madras library has the advantage of possessing a very large number of Sanskrit MSS. In fact there will be found few libraries either in Asia or in Europe which can rival it in this respect. But it is not only the number of granthas (1249) which entitles the library to rank amongst the first: the quality of the books is equally remarkable, and we find among them a very large number of hitherto unknown works and some which were thought to be lost. In Vedic and Vedantic literature there is a fine collection of Upanishads(*b*),—the largest known. It contains as many as one hundred and eight books designated by this name, most of which are accompanied by commentaries. It is true that only a small portion of these Upanishads can be regarded as part of the çruti, the ancient Veda-literature. Most of

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(*a*) A Catalogue Raisonnée (*sic.*) of Oriental Manuscripts in the library of the (late) College, Fort Saint George, now in charge of the Board of Examiners. By the Rev. William Taylor, Madras, vol. I 1857, vol. II, 1860.

An Alphabetical Catalogue in the Vernacular and English characters of the Oriental Manuscripts in the library of the Board of Examiners, prepared by order of Government by T. S. Condaswami Ayyar, Librarian MSS. library, vol. I. Madras, 1861.

(*b*) A class of writings whose object is to discover the secret sense of the Veda.—*Ed.*

them are written in the interest of sects and are consequently of comparatively modern origin. But though this be the case, and though we already possess good editions and translations of the old Upanishads, the value of the Madras collection still remains very great. It will furnish materials for the further restitution of the texts and commentaries of the edited Upanishads and most important contributions to the history of the religious development of India.

Among the other works forming part of the Veda we meet with the two unknown names of Bráhmanas, Ashta and Chardi*(a)*. But we do not learn from the Catalogues to which Veda and çâkhâ they belong.

The number of books belonging to the Vedângas seems to be comparatively small. There are however some interesting works. The copy of a Yajurveda-prâtiçâkhya, whether it belong to the White or Black portion of this Veda, will be a welcome addition to the exceedingly scanty stock of compositions of this class. Two other books, the Çixâchandâmsi(?) and the Udochhadara(?) vyâkhyâna likewise seem to refer to Vedic grammar and may furnish new information on this difficult subject.

Amongst the Smârtasûtras, the Âpastambha-gṛihya and dharma deserve to be noticed, as MSS. of the former*(b)* have not been found elsewhere, and only very few copies of the latter are known.

In post-Vedic literature nearly all branches, with the exception of the Sâṅkhya and Yoga philosophy, are well represented. There are good collections of MSS. of the Epic poems, the Kâvyas, the Purâṇas, Dharmaçâstras, tales and fables, as well of the works on science and Mîmâṁsâ and Nyâya philosophy.

(*a*) Vol. I, p. 197, II, p. 312.

(*b*) Since I wrote this two copies of this work have been obtained in the Dekhan.

Some other classes of books deserve the particular attention of Oriental scholars, as they contain large and important additions to the hitherto known stock. Firstly, amongst the dramatic compositions we find no less than eighteen titles of new plays, most of which even were not known to exist. I here give these titles in alphabetical order and as spelt by Mr. Taylor :—

1. Ananga Brimhavidyavilásam (read Brahmavilâsa) Cat. R. vol. II, p. 363.

2. Ananta jîvanam by Atreya-Varata(?)-cavi I, 82.

3. Jagan móhana (fragment) II, 43.

4. Camalina Calahamsa II, 362.

5. Lacshmi-svayamvaram (read Laxmîsvayamvara) by Srînivása Cavi I, 81.

6. Misra bhánam (read Miçrabhâṇa ?) by Gunda Ráma, II, 363.

7. Mucundánanda bhánam (read Mukuṇḍânanda bhâṇa) by Mucundânanda II, 359 or according to II, 363, 368 by Cási pati (read Kâçîpati.)*

8. Naracâsura vyáyoga by Dherma cya vidhuvan(?) I, 12 or according to II, 42, 360 Dhermasuri(?)

9. Nágánanta (read Nâgânanda) by Srí-Harisha (Çrî-Harsha) I, p. 82.

10. Náráyani-vilása nátacam(?) I, 81.

11. Prahasnam (read Prahasanam) II, 360. The true title is probably left out, as Prahasana is the name of a class of dramatic compositions.

12. Prasanna Rághavam by Jaya déva, I, 82, II, 43, 359, 360, 401.

13. Ranga nát'ha prahasnam (read prahasanam) by Ranganát'ha, II, 368.

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* A copy which lately came into my hands shows that it was composed by Kâçîpati.

14. Sankalpa sûryódayam (read sûryodaya) by Vedantáchárya II, 359 and ṭîkâ I, 13, II, 361.

15. Sóma vallica yagánanta Prahasana-nátacam *(sic)* by Dindima Cavi I, p. 82, entitled also Sóma vali prahasyanam (read vallî prahasanam) by Dindima Cavi otherwise known as Arana giri nát'ha (?) I, 334.

16. Subhadra-dhananjaya nataca by Ráma cavî I, p. 81.

17. Vasanta tilakam bhána. By Varadáchárya I, 87, 223, 333, II, 363, 364.

18. Vencatésa prahasnam (leg. prahasanam) II, 363.

Copies of some of these plays are known to exist elsewhere. The Prasanna-râghava is found in the libraries of Oxford and Calcutta, as well as the Nâgananda and Samkalpa sûryadaya. This play, as well as the Narakâsura badha, the Vasantatilaka, Mukuṇḍânanda and Miçrabhâṇa, is known also in the Mahratta country and Gujerath. A particular interest is attached to the Laxmîsvayamvara, as we are told in the Vikramorvaçî and elsewhere, that the first Hindú drama composed by Bharata and acted in Indra's heaven bore this name. It would be interesting to learn if this Laxmî-svayamvara of Çrînivâsa has any claim to antiquity and *can* have given rise to this legend.

Not less interesting than the plays is the collection of grammatical works. Besides a good assortment of the more common books, it appears to contain one new work, or as it would seem, a number of fragments, of the grammar of Çâkaṭâyana. This grammarian is older than the other writers on grammatical subjects, whose works are known at present. He is quoted in the Prâtiçâkhyas, in Yâska's Nirukta and in Pâṇini's grammar. It is evident that the recovery of his writings would carry us at least one step further in the knowledge of the history of Indian grammar. It would give us material assistance in tracing the development of this important branch of Hindú science. It could not fail to throw at the same time light on many difficult and highly interesting questions regarding general Sanskrit literature. I add a list of the MSS. of these works as given in the Catalogue Raisonné.

1. Zakátayana vyakaranam (Çâkaṭâyana-vyâkaraṇam) "It contains sutras, brief aphorisms with vṛutta (read vṛitti) amplification (*sic*)." Cat. R. I, 348.

2. Zakatáyana do. I, 349.

3. Sácatáyana vyákyánam, a commentary on the sútras of Pánini (*sic*) by Sáctáyana (*sic*) I, 353. If the book is really composed by Çâkaṭâyana the description must be wrong.

4. Gana pattam, lexicon, by Sácattáyana (read Gaṇapâṭha mascul.) I, 399. The description of the work must be totally wrong, if the work is really a Gaṇapâṭha. For Gaṇa-

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(*a*) Regarding Çákaṭáyana, the following extract from a letter, dated May 22nd 1863, from Professor Goldstücker to the Editor, will be perused with interest. "Before I chat with you on our and my doings in this part of the world, let me allude briefly to the immediate cause of this letter, I mean the great and mysterious Çákaṭáyana. That he is great, no believer in the eight books of Páṇini can doubt without tainting himself with heresy. For Páṇini mentions him, as his Patañjali says, *pújártham*, "to do him honour"—and Páṇini can do no honour to a little man. This mysteriousness, however, is another affair, which I will explain to you, in order to obtain light from you. Çákaṭáyana is a family name which may belong to more than one personage. One such grammarian is named by the author of the Gaṇaratnamahodadhi. I mentioned the fact, and the importance attached to Çákaṭáyana's name in my "Páṇini, &c." p. 177 ff., but on examining closely all the passages of that work, I arrived at the conclusion that this Çákaṭáyana very probably cannot have been the predecessor of Páṇini. A grammar of Çákaṭáyana in Sanskrit, but in the abominable Hala-Karṇáṭa-characters, is amongst the palm-leaf MSS. of the India Office. I have had a number of passages copied from it for me—and the result of my investigations is that this Çákaṭáyana too, is *not* the one mentioned by Páṇini. The last hope is therefore your Çákaṭáyana at Madras; but as the MS. of the India Office comes, I believe, likewise from Madras, I greatly apprehend that both may contain the same work."

pâṭha is the name for the lists of words comprehended under the several rules given in the grammar.

Besides these two classes of works, the books on the doctrine and history of the various Hindú sects cannot fail to excite the greatest interest. As many of these originated in the South of India, it is not surprising to learn that Madras is richer in the writings of Sectarians than any other library. We find there numerous works ascribed to Çankarâchârya, Râmânuja, Râmânanda, Madhvâchârya and other heads of sects, together with the commentaries of their disciples, as well as numerous tracts on the ritual and history of the sects in question. Many of these works are at present unique, and should the time come, as we trust it will, when the now neglected last stage of the religious development of India, shall again engage the attention of Oriental scholars, we shall have to look to the collections of Madras chiefly for further information on the history of the fall of Hindúism.

Finally the catalogues themselves call for some remarks. Regarding the Catalogue Raisonnée (*sic*) of the Rev. W. Taylor, little, unfortunately, can be said in its favour. No scholar can agree either with the general principles of the work or with its details. Each volume of this catalogue comprises a distinct collection, the first that of the East-India-House, the second that of the "Donative MSS." The MSS. of each collection are divided into families according to the materials on which they are written. Next, those of each family are sub-divided according to languages, and those containing works in the same language according to the characters in which they are written. Then only fallows the arrangement under general headings according to the subjects of the works in *alphabetical* order, and under each the MSS. are arranged according to their press-marks, separating those of the same book frequently by great distances. This scheme is certainly ingenious, but most unpleasant for those who have to use the catalogue, as it gives much trouble to find what one wants. The different copies of the same work instead of being arranged together are scattered in six, seven or more places. Thus in the first volume the MSS. of the Amarakosha are entered at pages 24, 109, 110, 111, 140, 243, 244, 245, 393-396, 598, 477. Unquestionably it would have been more rational and practical to have arranged the Sanskrit MSS.,—without taking into account the materials on which, or the characters in which they are written,—according to the branches of literature, to which they belong. In each class the works then ought to have been placed in chronological order, or in the positions assigned to them in the Hindú system of literature. Thus the first heading ought to have been "Vedic literature," subdivided in the following manner:—A. Ṛigveda, I, Mantrasaṁhitâ II, Brâhmaṇas, III, Âraṇyakas, IV, Upanishads, V, Çixâ and Prâtiçâkhya, VII, Chandas VIII, Kalpa, Çrauta Gṛihya and Dharmasûtras, IX, Jyotêsha, X. Anukramanîs and Pariçishṭas, B. Yajurveda, I, Taittirîya, II, Çukla, C. Sâmaveda, D. Atharvaveda. Each of the divisions B I, B II, C. and D must be sub-divided just like A, and after each work its commentaries and Paddhatis should be arranged.

But one would not quarrel with the reverend gentleman on account of the irrational arrangement of the MSS., if he had only chosen his "subject-matter" divisions properly, and consistently placed the same books in each. Unfortunately the confusion becomes perfectly bewildering through his total neglect of these two points. Firstly, we have a heading "Miscellaneous," under which a very large number of fragments and often entire books of the most different branches are jumbled together. This division occupies nearly one-seventh of the whole space allotted to the Sanskrit MSS. in the first volume and one-fourteenth in the second—in all 96 pages. Secondly, the same branch of literature is frequently given under different headings. Thus Mr. Taylor sometimes comprises the law-books under "Dharmaçâstra," XI, p. 12, sometimes under "Law," XXI, 392 and sometimes under "Smṛiti," I, p. 184 Nay, he even gives the works on Rhetoric written in Grantha characters and belonging therefore to the same subdivision under two different headings—"Art of poetry" and "Rhetorical," I, pp. 72 and 165. Thirdly, several headings are so badly chosen, that it would have required greater care and attention than Mr. Taylor seems to be able to bestow on his work, to prevent confusion. Besides the heading "Vedantic" we find also "Advaita" and "Tatva Metaphysics," besides three general headings—Çaiva and Vaishṇava, and Çakti, we find Sectarial-Polemical. Now "Advaita" is one branch of Vedânta, and Tatva Metaphysics, a monster invented by the Rev. gentleman, and the Çaiva, Vaishṇava, Vîra-çaiva, and Çâkta systems are just as well "Sectarial," and nearly all their works are "Polemical." It was therefore wrong to make these divisions at all, and the result has been that works of the same class are scattered under three or four headings. In a similar manner Mr. Taylor gives frequently a heading "Romance Historical" and comprising the Kâvyas; another "Tales," I, p. 195, II, 298, twice containing exactly the same description of works and several times the same books, which were before arranged under "Romance Historical."

Sometimes also Mr. Taylor contracts two or three headings under one. Thus we find "Veda, Vedânta and Upanishads" now under one heading, now separated: I, p. 66, Vedantic and p. 67 Vedas or Upanishadas*(sic)*; p. 196 Upanishadas, p. 198 Vedantic, p. 205 Vedas or comment on them: p. 306 Vedantic, p. 308 Vedas or Upanishadas: II, p. 311 Veda and Vedanta, p. 350, Vedas and Upanishadas.

Another frequent inaccuracy is that copies of the same work are entered under two different titles. For instance we find the Védanta pari bhâshya (read pari bhâshâ) II, p. 12 under "Vedânta" and II, p. 20 under Advaita : the Vasantatilaka, I, pp. 87 and 223 under "Erotic," I, 133, II, 363, 364 under "Dramatic" : Chambu (leg. Champû)—râmâyaṇa I. 80 under "Dramatic" I, 175 under "Romance," the Itihásasamuchhaya, I, 83 under "Ethical:" I, 193, 302 under "Tales :" the Scánda upapuránam *(sic)* I, p. 291 under "Pauranical," I, p. 300 under "Saiva Sectarial" etc. Other books are arranged under wrong headings, e. g. I, p. 11, Srâddhavidhi by Aba-stambha-muni, (read Âpastamba) under Dharmaçâstra, whilst it belongs to "Ritual :" I, p. 3, Sancalpa Sûryodaya vyakyánam (read vyâkhyânam) under "Ethical", whilst it ought to stand under "Dramatic," I, 108 : Naityika mantra vyâkhyânam under "Incantations," whilst it belongs to "Ritual." I, 66 and 67, four copies of the Madhvavijaya under "Vedantic," which ought to stand under "Sectarial," as the work describes the life and opinions of Madhvâcharya, the head of the Brahmasampradâyîs. These few specimens will give the reader an idea of the chaotic confusion prevailing throughout the work.

But this is not all we have to say against Mr. Taylor's Catalogue. The introductions to the "generic" headings in the preface, the descriptions of the books are full of the grossest faults, inaccurate and unscholarly. What must we think of the Sanskritic attainments of the Rev. Mr. Taylor, when we see him translate (I, 196) the title of the well-known Brihadâraṇya or Brihadâraṇyaka by "*the spreading forest,*" whilst it means the great âraṇyaka, *i. e.* the portion of the Veda to be recited in the woods ? or when he tells us about the same work I, p. 197 : "the writer is said to be Brihadâraṇya Rishi" ? In another notice of the book he correctly names Yâjñavâlkya as the supposed author. Further proofs for our assertions are found in the following instances.

Vol. I, 12, Vyayogacya nátacam (read Vyâyogâkhya nâṭakam) where the proper title Narakâsuravadha has been omitted. Vyâyoga is the generic name of a class of dramas.

Vol. I, 93 and 140 we read, "No. 1882 Siddhanta kâumudi vyákyánam, by Pràudha manoramâi" (read manoramâ). Here the title of this commentary on the Siddhântakaumuḍî, Prauḍhamanoramâ, has been mistaken for the author's name. The author is Bhaṭṭojîdîxita, who commented on his own work, the Siddhânta-kaumuḍi.

Vol. I, p. 67, Mr. Taylor makes the extraordinary statement, that the "Taittîrîya-samhitâ, relates to the Yajurvedam" (read veda, masc.) The fact is that the Taittirîya-saṁhitá is the first part of the Black Yajur-Veda.

In Vol. I, 114, No. 1893 and p. 118, No. 1898-1900, p. 116 No. 1828, the term Nyâya is constantly translated by "knowledge or wisdom," though it *never* has this meaning, and in these titles apparently signifies "Nyâya philosophy."

Vol. I, 199, l. 6 f. a., Viçishṭâdvaita is translated "almost advaita." It means the doctrine of unity (advaita) with attributes (viçishṭa).

Vol. I, 115, No. 1900 "Nyâyadîpaprabha (prabhâ), torch of knowledge (?) being a commentary on a work entitled Sashadhara, or the "hare-bearing moon—on logic." Here we have another quid pro quo. Sashadhara, or more correctly Çaçadhara, is the name of an *author*, who wrote a book entitled Nyâyadîpa or Nyâyaçâstradîpika. A commentary on this work is named Nyâyadîpaprabhâ, illustration of the Nyâyadîpa. This fault is so much less pardonable as Mr. Taylor himself states all this correctly on p. 111, No. 1901.

Before concluding this list of specimens Mr. Taylor's Sanskritic attainments, the reader's attention should be directed to a passage in the "Introduction" to the article Veda, where the Rev. gentleman gives some specimens of the "Veda language" transcribed according to "the Jonesian orthography." He cites three passages of the Rigveda, one from each volume of Max Müller's edition. It will be enough to reproduce only one, the second, and Mr. Taylor's remarks, which apply to this in particular as well as to all three.

We read in volume II, page lxxxi:—

Tattrâisha sukre prat'hama
Yo jā́ta prat'hami sana khā́ndevò devan kratunà parya b'húshat—

Yasya sushma dodasi ab'hyasetàm nrịnnasya maha sa janasa danda—
Yah játa ráva prat'hamah—manakhan—devah—devan—
Kratuna—pari—ab'hushat—
Yasya—sushmat—rodasi dati—ab'hyaseṭàm—nrinnasya—mahā—sah—janasha—danda.

Volume II, p. 469.

Then follows the passage from Max Müller's Rig Veda, v. III, p. 949, and Mr. Taylor goes on to say: "It will thus be seen that the composition is evidently designed for measured intonation by more than one person; and with recurring *alliteration* (as to *words* and letters) of a peculiar kind."

I can only gather two things from these quotations, firstly that Mr. Taylor cannot properly read the Devanâgarî characters, and secondly that he does not understand a single word of the passages which he quotes. In order to prove the first charge let us go over these lines, which, as they stand, are just as little Sanskrit as Tahitian. In the first line we have Tattrâisha for tatraishâ, sukre for sûkte, prathama for prathamâ; in the second, prathami for prathamo, sana khándevo for manasvân devo, devan for devân, parya bhúshat for paryabhûshat, and after jâta eva is left out: in the third line sushma dodasi for çushmâdrodasî, nṛinnasya for nrimṇasya, maha for mahnâ, janasa for janâsa danda for indrah : in line 4 játa for jâtah, ráva for eva, manakhan for manasvân, devan for devân : in line 5 rodase dati for rodasî iti, nrinnasya for nṛimnasya, mahā for mahnâ, janasha for janâsah, danda for indrah. Now it is very curious that all those letters or groups of letters, which Mr. Taylor mistakes one for the other, kte and kre (क्ते and क्रे) ma and sa (म and स) sva and kha (स्व and ख) da and i (इ and द) ra and e (रा and ए) mî and mo (मी and मो) bear in Devanâgarî some resemblances to each other. This fact, I think, strengthens our hypothesis regarding the origin of these little mistakes.

Now for the second charge, Mr. Taylor does not seem to be aware that the words "tatraishâ sûkte prathamâ" do not belong to the text of the Veda. They are the commentator Sayaṇa's and mean : "Here follows the first verse of the hymn."

Secondly, as Mr. Taylor speaks of "the alliteration (as to *words* and letters) of a peculiar kind," it appears that he was quite ignorant of the fact that in this, as well as the two other passages, he has copied the same verse TWICE OVER, first in the Samhitâpâṭha, where the words are connected, and next in the Padapâṭha, where the words are exhibited separately. Sapienti sat!

Another class of mistakes occurs in the spelling of the names and Sanskrit words. We find quite absurd and ungrammatical forms, like Brahmam for Brahma (base Brahman) karmam for karma (base karman), pátam (neuter) for pâda (masc.) vâtam (neuter) for vâda (masc.), Bhattoji dikshada for Bhaṭṭojîdîkshita, kuvalâiyánantam (neuter) for kuvalayânanda (masc.), Appâya dikshada for Apyaya dîkshita etc. On the first five pages of Vol. II, we counted upwards of forty such blunders. Owing to this inaccuracy it sometimes becomes impossible to make out the correct form of the name. It would therefore seem that not all these mistakes are mis-prints "which can be readily corrected by an intelligent person with a pen" (Vol. II, page xciii). One must, however, admire the ingenuity and lofty moral tone of the excuse that follows: "A list of *errata*, besides being unsightly, has the disadvantage of implying that there are no other errors; which never can be safely asserted and should not be implied."

The description of the external appearance of the manuscripts is likewise inaccurate, so much so that it would be impossible to identify them. Frequently the number of leaves is not mentioned. We miss the notice of the dates when the manuscripts were copied, which is generally given by the copyist. The description of a book as "long and thin" or "medium length" etc. is useless. The correct plan, which has been followed about a dozen times, would have been to give always the exact measure by inches or by the numbers of lines and syllables. Besides this, the first and last line of each book and chapter ought to have been quoted in full, without which a manuscript cannot be properly identified.

In fine I can only regret that so much time and money should have been expended in order to produce so untrustworthy and unpractical a catalogue. In order to find out a single work it is often necessary to go over the whole catalogue, and when it is found one is frequently brought to doubt its identity. Under these circumstances I cannot but express the wish, in which every Orientalist will join, that the Madras Government may complete its generous work, and engage the services of some really sound Sanskrit scholar to prepare a catalogue which will satisfy the requirements of modern philology.

The alphabetical catalogue of Mr. T. S. Kondasvâmi Ayyar likewise calls for a few remarks. It has been made up apparently with the help of Mr. Taylor's catalogue and consequently shares a great many of its faults and deficiencies, such as wrong titles, double titles for the same work, ect. It is likewise not free from mis-spellings and ungrammatical forms, though on the whole it contracts favourably in this respect with Mr. Taylor's work. Its worst fault is, that it systematically departs from the principle of alphabetical arrangement, if one volume includes more than one work. We should advise Mr. Kondasvâmi Ayyar to alter this in the following volumes, otherwise his work will be of little value.

G. BÜHLER.

September 1863.

On the Madras Survey of the Southern Heavens, by N. R. POGSON, ESQ., F. R. A. S., *Government Astronomer.*

A complete survey of the heavens, shewing in clear and well-arranged maps, every star visible at the date of their construction down to a faint order of brilliancy, has in all ages been an evident and pressing want, but one which, until within the last few years no astronomer ever attempted to supply. By some it may have been deemed a piece of drudgery unworthy of their higher capabilities, while others, less ambitious and therefore better fitted for so vast an undertaking have held back, probably overawed by the very extent of the task before them. Its importance cannot however be overrated, and its accomplishment will do more to facilitate the labours of future observers than any other event recorded in the annals of the science. Numerous atlases and catalogues of stars have been made within the last half century, but until recently, none which could be regarded as faithful and indubitable representations of the heavens at the date of their construction. Celestial charts were formerly made by merely plotting down observed stars from known catalogues, without subsequent telescopic revision. As may be readily imagined, maps so formed abounded with omissions and errors; stars being frequently inserted of a fainter class than was intended for the limit of magnitude, while numerous brighter ones were left out altogether. The great catalogues, and most especially the zone observations made under the direction of the eminent astronomers Lalande, Bessel, and Argelander, comprising above one hundred thousand different stars, valuable and accurate as the two latter series especially are, give no definite idea of the stars actually visible with a telescope only two inches in aperture. A survey, worthy of being so called, must be so scrupulously revised, that no single star exceeding its stated limit in brilliancy shall be omitted; and the fact of an object not being inserted therein, must be proof of its inferiority to such photometric limit at the time the survey was made. Unless such accuracy can be ensured, the whole is comparatively of little worth; but with patience and perseverance the desired result, though confessedly very laborious, is nevertheless attainable.

Considerations of this nature induced the distinguished Director of the Royal Observatory at Bonn, to survey and map the entire northern hemisphere, including all stars down to the 9½ magnitude, and aided by his well-trained assistants, the enormous task was completed in less than eight years. Professor Argelander and his staff commenced operations in the spring of 1852 and concluded the requisite observations in 1859, having entered down the positions of above three hundred thousand stars between the equator and the north pole. This crowning act of a career, the most energetic and brilliantly productive on record in the history of practical astronomy, was acknowledged by the Royal Astronomical Society of London, by the award of its gold medal, in February last.

In the year 1854, Mr. Carrington, then the possessor of a well-equipped private observatory at Redhill, commenced a survey of a more limited portion of the northern heavens; viz., that within nine degrees of the pole. His noble contribution to astronomical science comprised not merely the mapping of this most difficult portion of the hemisphere to a much fainter limit than in the general survey of Professor Argelander, but also the accurate meridian observations of 3,735 stars, none less than three times each star. Aided only by a single assistant, this labour was accomplished within the short space of three years. He too, in the year 1859, most deservedly gained a recognition of his valuable services by the R. A. S. similar to that since rendered to Professor Argelander.

Other portions of the heavens have been more or less accurately mapped by various observers, chief among whom, and indeed first in the field, stands our well known English astronomer J. R. Hind, whose comprehensive series of ecliptical charts has done so much towards the discovery of the minor planets and of new variable stars. It is to be hoped that the few remaining numbers of his series yet unpublished will be speedily forthcoming. These charts are confined to within three degrees north and south of the ecliptic, and contain stars down to the eleventh magnitude. Ecliptical charts have also been formed by Monsieur Chacornac, of Paris, formerly at Marseilles by Mr. Graham, at

Mr. Cooper's Observatory, Markree Castle, Sligo; and by the writer at the Radcliffe Observatory Oxford.

Thus, while the polar and zodiacal portions in particular, and the northern hemisphere in general, have been explored by Argelander and others, no steps had until lately been taken for similarly overhauling the southern hemisphere. That task, precisely similar in its nature and extent to Professor Argelander's in the north, I have formally undertaken at the Madras Observatory; and though from not being able to turn my undivided attention thereto until another work, an "*Atlas of Telescopic Variable Stars*" now in hand has been completed, and also from the climate of India being less suitable for bodily exertion than that of Europe, the Madras Southern Survey will probably be longer in hand than Professor Argelander's was, it was nevertheless commenced on January 1st 1863, and will I trust be completed by me, if blessed with life and health throughout the required number of years.

It has been suggested, that, since the polar portion of the southern heavens is not visible at Madras, the work should be divided between this and some southern observatories, but against this proposal I beg to enter my most earnest and decided protest! All members of the Indian Service must at some period or other of their term take leave of absence to visit a cooler climate, and when such change becomes requisite in my own case, I purpose to visit Australia or the Cape of Good Hope, and having all previous preparations duly made, there to complete the few southern maps not observable at Madras. While the southern nebulae, double stars, and the polar region offer ample choice of unappropriated pursuits, it would be a pity to see the same undertaken in unfriendly rivalry at different observatories; while being first in the field, I pledge myself never to retire therefrom unless compelled to do so by failing health. Wherever else therefore a partial survey of the southern hemisphere may be attempted, it must be at once clearly understood that it is independent of the Madras Survey. Before leaving England, at the close of the year 1860, my intention of extending Professor Argelander's great work southward was well known to and warmly approved by Mr. Hind, Mr. Carrington, Admiral W. H. Smyth, the Revd. R. Main, and many other leading scientific friends, and my promise was given to the Government of India to begin the work with as little delay as possible. The dilapidated state of the observatory, the overwhelming arrears of meteorological and magnetical reductions, and the general inefficiency of the means at my disposal, all combined to render delay inevitable; but it is with much pleasure I am now able to state that, thanks to the lively interest taken by His Excellency Sir W. Denison in the promotion of science, thorough renovation of the buildings and revision of the staff of assistants have been sanctioned, and that such improvements have already been more or less completed as will prevent further loss of time and will tend greatly to increase the activity and efficiency of the observatory.

Lastly; it is with the warm approbation of Professor Argelander *himself* that I am now proceeding with the extension of his northern survey in the opposite hemisphere. I feel most deeply indebted to him for many valuable hints—the ripe fruits of his vast experience—with which he has favored me in prompt reply to my appeal for such assistance. Nothing could however be more contrary to Professor Argelander's own wishes and judgment, than that an observer in a totally different climate should be forbidden to exercise his own discretion and compelled to make the southern survey a mere copy or continuation of that executed at Bonn. Yet such has been laid down as a rule for the contemplated *opposition* portions elsewhere provisionally allotted. It is as well at once to disclaim any such intention on my own part. The scale of projection, and as a matter of course the magnitude of the stars in the Bonn charts, will be most strictly adhered to, but certain other points of departure appear to me desirable; and having had more than a dozen years' practice in every detail of celestial chart-work, (at first under Mr. Hind himself, the chief English authority in all such matters,) I feel perfectly justified in adopting my own methods and arrangements for the accomplishment of the heavy labour before me. While gratefully and eagerly profiting by the able counsel afforded me by Professor Argelander, Mr. Hind, and *others I may see fit to consult,* unsought recommendations from inexperienced hands will be utterly disregarded, and viewed only as intrusive and unwelcome, from whatever source they may emanate.

The following is a brief outline of the scheme of the Madras Southern Survey.

Number and Arrangement.—The charts will be seventy-nine in number; each only half the size of one of Argelander's. They will overlap one degree in declination at the southern limit, and the same quantity forward in right ascension, but not at the opposite edges. Dividing the whole hemisphere into five principal sections, the arrangement will be as follows:

Chart Number.	Limits of South Declination.		Width in R. A.	
	°	°	h.	m.
1 to 24	0 to	21	1	4
25 to 48	20 to	41	1	4
49 to 66	30 to	61	1	24
67 to 78	60 to	81	2	4
79	One circumpolar chart of 10° radius.			

Preliminary Reductions.—The catalogues from which the chief mass of fundamental points will be derived are those of Lacaille, Taylor, Weisse's Bessel, and Oeltzen's Argelander. Every available star will however be reduced up to the adopted epoch, from every accessible known catalogue, and the whole will be collated, to form the separate lists of zero stars required for the zones of the respective charts. This is unquestionably the most tedious part of the whole undertaking, but far lighter for the southern hemisphere than that which Professor Argelander and his staff must have gone through for the northern portion. Apart from the necessity of such a reduction for the zero points of the survey zones, the complete revision thus afforded of all recorded positions of southern stars is in itself a work of much importance at the present time.

Instruments employed and mode of using them.—So long as it remains in my possession, the exquisite five foot Smythian telescope, the property of Dr. J. Lee, F. R. S. of Hartwell, originally made for Admiral W. H. Smyth, may be regarded as the standard instrument with which the survey is intended to be made. In case however of its being recalled, I have had the object glass of the old Madras Transit instrument, 3·94 inches in clear aperture, mounted upon one of Troughton and Simms's universal equatorial stands; and though inferior in quality to Dr. Lee's telescope, its somewhat larger aperture entitles it to rank as a secondary standard. Dr. Lee has most kindly lent me his instrument ever since the year 1857, and I doubt not that in consideration of the important service it will render if employed as proposed, he will, with his characteristic readiness to encourage every scientific undertaking which gains his approval, permit me to retain it on a much longer loan.

Although a five foot telescope is to be regarded as the standard size for the survey throughout, others will be freely employed; experience having long shown me the great advantage derivable from the use of different sized telescopes. For the broadest zones, and finest moonless nights, a 2¾ inch aperture, fitted on to the universal equatoreal stand before-named will be employed; while for moonlight nights, and zones at low altitudes, the Lerebours' equatoreal will be used. The eye will *always* be previously prepared by first turning to the nearest variable star map in my "ATLAS" at about the same altitude, and carefully remarking the appearance of the comparison stars of well known magnitude as given in such map. Zones may thus be taken within very few degrees of the horizon, with ease and tolerable certainty; and presuming that the observer has the magnitude scale of the five foot pretty well impressed upon his memory, the use of another telescope simply demands the allowance for difference of penetration due to the various apertures, computed by the formula: $M - m = 5\ (\log. A - \log. a)$—in which M and m stand for the apparent relative magnitudes of the same star seen through the apertures A and a. Thus; a star of the 9·0 magnitude in the five foot, another of the 8·4 magnitude in the smaller telescope, and a third of 10·2 magnitude in the Lerebours equatoreal, appear all equally bright, under similar atmospheric conditions, and near the same altitude, when viewed with magnifying powers also proportional to the aperture of each object glass. The powers employed are from ten to twelve times the aperture of each telescope. The reticles are all of one form: a thick vertical bar, one edge of which bisects the field of view, leaving the preceding half clear, for the better estimation of magnitudes. Horizontal bars run across the following segment at intervals of five minutes of arc apart; the central and every other bar being exactly half, and the intermediate ones one minute in thickness, so as always to be visible without illumination of the field. With this reticle right ascensions are noted to the nearest second of time, and differences of declination to the nearest half minute of arc. Greater accuracy is neither attempted nor desired for the object in view. The usual width of a zone is half a degree, though in certain parts of the heavens in which stars are less numerous than elsewhere, this may be increased to forty or even fifty minutes: while on the other hand, in more densely sprinkled parts, zones of twenty or even ten minutes width may be found most convenient.

Although the actual number of starlight nights throughout the year is decidedly less at Madras than in England, their equability and superiority in regard to clearness and steadiness of vision is incomparably in favor of the tropical skies. The fine weather comes altogether, from January to May, with a few breaks in the later months of the year; and it must be remembered that zoning near the horizon is safe and easy here, when in England it would be rarely possible at double the altitude.

Construction and Revision of Charts.—My own practice in this matter is, I am aware, quite at variance with the views of many who consider duplicate or triplicate zones requisite to guard against errors. I can only express my opinion founded upon long experience, that such reobservation of the same ground is mere waste of time, and no guarantee of the accuracy of the maps. My plan of proceeding is this. A zone of stars having been carefully observed, including all that time will possibly admit of being recorded as they pass through the field of view, and the reductions to epoch having been obtained from the preliminary catalogues, all stars, new and old alike, are inserted in the manuscript chart *in pencil,* the estimated magnitude being entered against each star. Upon revision, by slowly sweeping with the telescope over the zone under examination, with the reticle in the field of view, each individual position and magnitude is verified, and the magnitude number crossed through horizontally, and no star is ever inked in until thus checked. Omitted stars are at the same time interpolated differentially, *never by estimation*, and these again await a similar revision on a subsequent night. Thus, and thus only can I conceive it to be possible to ensure the perfection of the work; but by strict adherence to this simple plan, the omission of a star, or an error of position recognizable on the scale of projection employed can only arise from gross negligence; and such I trust will never be found in any portion of the Madras Southern Survey.

Publication.—Lastly;—as regards the time and order of publication of the various charts:—partly owing to the yet unfinished state of the Observatory, the improvements and alterations in which are far from completed although considerably advanced—but chiefly from the priority due to the Variable Star Atlas, which it is now hoped speedily to have out of hand, I scarcely venture to expect that the first issue of a Survey Chart can be ready under two years from this time. The repairs and the atlas once completed, the maps will however make rapid progress, and they will be published as finished, regardless of numerical order. Nos. 3, 4, 15, 16, 19, 20, 62, 63 and 64 are now in hand, though but little has been done at any of them in the way of actual observation. A complete though necessarily very condensed star-catalogue will accompany each map. The final revision will in no case be entrusted to another, so long as I possess health and energy to accomplish it myself. Numbers 1 to 24 will probably be the *last* to appear, as they require by far the greatest amount of labour, both preliminary and throughout their construction; while their want is in a great measure already supplied by the Berlin Academical Charts, the southern halves of which fall entirely within their limits.

N. R. POGSON.

MADRAS OBSERVATORY,
December 1863.

On the discovery of Two new variable Stars, by N. R. POGSON, ESQ., F. R. A. S., *Government Astronomer.*

THE search for new minor planets maintained during the past year with the Madras equatoreal, although not successful in its primary object, has nevertheless been the means of adding to the list of recognised variable stars, two interesting members hitherto unknown. Trusting that a brief account of these discoveries will not be out of place in the Madras Journal, the following particulars have been communicated.

The first, now known as U Scorpii, was detected on the 20th of May 1863, shining as a star of the ninth magnitude, in a spot in which no such object had been previously recorded, though most carefully watched in each successive May since 1854. Micrometrical measurements from an adjacent known star at once proved its fixity, and thereby suggested its probable variability. The following evening sufficed not only to confirm this impression, but also to show that the new variable was one of an extraordinary character, changing in brilliancy with a rapidity equalled only by one star of a similar nature, discovered by Mr. Hind, in the constellation Gemini, in December 1855. Eight days later, when last seen, U Scorpii had diminished to below the 12th magnitude, or less than one-seventeenth of its brilliancy on the 20th. Full moonlight prevented any further records of the vanishing star, but taking advantage of a very fine interval during the totality of the lunar eclipse of June 1st, its invisibility was satisfactorily established; and though sought for on every suitable opportunity throughout the following five months, it has not since reappeared.

The light comparisons actually made were as follows:

1863 May	20th	9·1	magnitude.
„	21st	9·6	„
„	22nd	10·1	„
„	24th	10·5	„
„	25th	11·0	„
„	26th	11·4	„
„	27th	11·9	„
„	28th	12·2	„

Of the other new variable, situated in the constellation Sagittarius, little more can be said than that it was first seen on July 19th 1863, as a somewhat ruddy star of the 8½ magnitude; and that from then until the present time it has slowly and steadily diminished to the 12th magnitude, or one twenty-fifth of its greatest recorded intensity of light. Dates of its actual invisibility in previous years cannot be furnished as in the case of U Scorpii, but if visible at all it was most certainly less than 11½ magnitude on August 30th 1859; on July 22nd, and on August 7th 1860.

The approximate positions of the two new stars, reduced to 1860, are:

	Light Range.	Right Ascension.			South Declination		
		h.	m.	s.	°	′	″
U Scorpii...	9·5 to below 13·5 magnitude	16	14	25·5	17	33	21
T Sagittarii.	8·5 to 12·0 „	19	8	9·4	17	12	11

N. R. Pogson.

Madras Observatory,
December 1863.

On two Manuscripts of 'Omar Khayyám's Quatrains.

By J. H. ARTHUR BRANSON, ESQ., *Barrister-at-law.*

WE have much pleasure in calling the attention of those to whom the poetry of the Lucretian Khayyám may be a subject of interest to two manuscripts now in the possession of our Honorary Secretary. One of these is peculiarly well worthy the attention of Persian scholars, inasmuch as it contains two books of the Poems of Nazírí (نظیری) a poet whose works are rarely to be met with and of whom consequently very little is at present known*(a)*. Had the manuscripts come earlier to our possession we should have been glad to have thrown on this almost unknown poet and his works what new light we could have gathered from the perusal of the two books of his poems in Mr. Stokes's manuscript. We are anxious however to lose no time in bringing to the notice of those who may have greater capabilities and more leisure the MSS. now under consideration. Such remarks as a necessarily hasty inspection suggest to us, we here place before our readers.

In the first of these MSS. we find the two books of Nazírí which, as well as the quatrains of 'Omar Khayyám, are on paper and bound together in one volume measuring 5½ inches by 10 and containing 217 leaves.

On the flyleaf is a note in Persian to the effect that the volume was bought at the Nawáb's auction on 29th Rajib 1275 Hijra, and on the first page of the manuscript is the mohur of the unfortunate 'Alí Hussain Khán Thaj ul Umra, the son of Umdut ul Umra and grandson of Wallajah.

(*a*) Is this 'Nasser Khosrou' of whom D'Herbelot (ed. 1697) writes 'ancien Poëte Persien, dont les Vers spirituels and devots, sont souvent citez par les Contemplatifs. Il en a fait de trés beaux sur la Retraite and sur la solitude.'—*Ed.*

Of Nazírí's works there are here, as we have said, two books "The Kussaid" and "The Díwán." (قصايد و ريوان) The manuscript is in Shikasta and bears evident marks of not having been written by a Persian. If we may express an opinion without going further than the appearance of the writing, we should say that it was written somewhere about the middle of the last century in the North-West. Of the time at which Nazírí wrote it is hard without a thorough examination of his poems to speak with certainty. A glance at the headings of some of the Kussaid shews us first an ode in praise of God and the Prophet, next twelve odes to the twelve Imáms (Nazírí was a Shiya), and then follows an ode to Abd-ul Muzuffur Jalahl Udín Akbar Patshá, and this is followed by several odes to ʿAbd-ul Rahím Khán-i Khán (the Khán of Kháns *i. e.* prime minister) of Akbar. This would lead us to the conclusion that this writer lived about 300 years ago; but there is little doubt that a careful perusal of his writings will easily set this point at rest.

Of the quatrains of 'Omar Khayyám which are bound up with these two books of Nazírí's it is to be remarked that the manuscript is incomplete, breaking off at the catch word of the 802nd quatrain. This fact would lead us to join issue with the Calcutta Reviewer who says of 'Omar "every other poet of Persia has written too much, even her noblest sons of genius weary with their prolixity. The language has a fatal facility of rhyme, which makes it easier to write in verse than in prose, and every author heaps volumes on volumes until he buries himself and his reader beneath their weight. Our mathematician is the one solitary exception. He has left fewer lines than Gray." We are however unwilling to differ on so hasty an inspection of this manuscript from the careful reviewer whose opinion we have quoted. The inexcusable failing of oriental copyists.

which leads to constant repetition of a favourite quatrain may and probably will account for much of the great discrepancy which here appears. Concerning the other known MSS. of 'Omar Khayyám, the following will be found in pages VIII and IX of Major Evans Bell's reprint:

" 'Omar has never been popular in his own country, and therefore has been but charily transmitted abroad. The MSS. of his Poems, mutilated beyond the average casualties of oriental transcription, are so rare in the East as scarce to have reached Westward at all, in spite of all that arms and science have brought to us. There is none at the India House, none at the Bibliothéque Impériale of Paris. We know of but one in England, No. 140 of the Ouseley MSS. at the Bodleian, written at Shiraz, A. H. 866 (A. D. 1460). [Garcin de Tassy has a copy of this MS. at Paris.] This contains but 158 Rubâiyát. One in the Asiatic Society's Library of Calcutta, (of which we have a copy) contains (and yet incomplete) 516, though swelled to that by all kinds of repetition and corruption. So Von Hammer speaks of his copy as containing about 200, while Dr. Sprenger catalogues the Lucknow MS. at double that number. The scribes, too, of the Oxford and Calcutta MSS. seem to do their work under a sort of protest; each beginning with a Tetrastich (whether genuine or not) taken out of its alphabetic order; the Oxford with one of apology; the Calcutta with one of execration too stupid for 'Omar's, even had 'Omar been stupid enough to execrate himself." Then, in a note, is the following: " Since this paper was written we have met with a copy of a very rare edition, printed at Calcutta in 1836. This contains 438 Tetrastichs with an appendix containing 54 other not found in some MSS."

The quatrains are also in Shikasta, and, except to one well accustomed to this style of writing, there would be some difficulty in getting through a few of them.

We miss here the anonymous preface which heralds in the quatrains in the Calcutta MS. the following translation of which is given in the sixth and seventh pages of Major Bell's valuable reprint: already cited. "It is written in the chronicles of the ancients that this king of the wise, 'Omạr Khayyám, died at Naishápúr in the year of the Hijra 517 (A.D. 1123), in science he was unrivalled, the very paragon of his age. Khwájah Nizámi of Samarcand, who was one of his pupils, relates the following story: "I often used to hold conversations with my teacher, 'Omar Khayyám, in a garden; and one day he said to me, 'my tomb shall be in a spot, where the north-wind may scatter roses over it.' I wondered at the words he spoke, but I knew that his were no idle words; years after, when I chanced to re-visit Naishápúr, I went to his final resting-place, and lo! it was just outside a garden, and trees laden with fruit stretched their boughs over the garden-wall, and dropped their flowers upon his tomb, so as the stone was hidden under them."

The Secretary has also shown us a second MS. on paper containing 122 pages, and written lately in Madras. Great credit is due to the scribe, Muḥammad Wazír, for the extreme care and clearness with which he has executed his task—a credit which he is unwilling to bestow on the copyist of the MS. which was his original, for at page 113, after the preface which we have just cited and which he, following the copy from which he has transscribed, places at the end of the quatrains, he has the following:

اما بقياس ناقص ناقل اين حرف وچنان مي درآيد
که اگرچه کاتب منقول عنه که اسم خودش محمد حنفي
الحسني نوشته بقياس خط مرد هندي نباشد وعرصهٔ
کتابش از سنه مذبور که سنه نقل حالست پيش از يکصد
وهشت سال مي نمايد اکثر رباعيات صراحتًا پر غلط

علاوه بسياري از رباعیات دیگران چنانچه افضل وغیره
که ذکر تخلص هم در بعضي موجود است واز وضع
مثانت تلزیم حکیم بالکل بوي ندارد واکثر رباعیات
درج نموده است مگر چونکه نامق اثم را از رباعیات
بلاغت آیاتش شوقي پیش از پیش در سر میدارد لهذا
نقلش معه خطبهٔ اخرش کانه نموده بر رباعیاتیکه بالکل
یا به بعض تبدل موسوم دیگر شعرایند اسامي شعرایش
که از بعضي تذکرجات ملاحظه نموده بود برحاشیه اش
نگاشته وبعضي را که باوجود عدم اسلوبش با مغالطهٔ
تصحیف بقیاس نیامد معه رباعیات حکیم خالي گذاشت
وفي الحقیقته طبع فهم وسلیم که آشنائی از کلام حکیم داشته
باشد ببداهت مي تواند یافت

که این کلام فصاحت تلزیم حکیم است سواے این
بعضي رباعیات متفرقه موسوم اعلم العلام حکیم عمرخیام
که بنظر این عاصی خاطی درآمده بود نوشته مي شود

"But in my humble opinion the MS. from which I have copied this is by Muḥammad Hunafu-ul-Hussaini, who, by his mode of writing does not appear to be a native of India. This MS. appears to have been written 108 years after the above date [A. D. 1123]. The greater part of the quatrains abound in errors and beyond this many are the quatrains of others, as Ufzl &c., some of which contain even the titular names of the poets who wrote them, and in many the scent and flavour of the learned 'Omar are absent both from the language and the metre. But as I, the humble copyist, was highly desirous to collect his Honour's elegant quatrains, I have taken an exact copy of them as also of the account of his life that was written at the end of the same. With respect to such quatrains as seemed wholly or partly to be the productions of other poets, I have noted on the margin the names of the poets who appeared on reference to some biographical works to be the authors thereof.

As to the quatrains the authors of which I was from clerical or other errors unable to discover, I left them untouched among the poems of the honoured 'Omar, without any of my notes; but it is easy for an intelligent and candid man who has had an intimate acquaintance with the productions of his Honour to decide at once whether or not they are his admirable poems. The following are a few quatrains which appear to me to bear the impress of the mint of 'Omar."

Of this as of the other MSS. we cannot at present give any thing like a particular account. It contains 563 quatrains before we come to the anecdote and comment which we have copied: following the above note are 31 further quatrains.

J. H. ARTHUR BRANSON.

February, 1864.

[NOTE by the Editor.] The private reprint by Major Bell mentioned by Mr. Branson consists of fifty copies and appeared at Madras towards the end of 1862. It contains, first, "Rubáiyát of 'Omar Khayyám, the astronomer-poet of Persia, translated into English verse" (London, Quaritch 1859). The translator, Mr. Edward Fitzgerald, already renowned for his version of six of Calderon's dramas*(a)*, has here, we venture to say, for the first time produced an English metrical version of an Eastern poet worthy at the same time of the poet himself and of the literature to which that poet has been introduced. Here again we find the same purity and vigour of language which have been admiringly dwelt on by Archbishop Trench when dealing with Mr. Fitzgerald's *Calderon;* and the tiresome effect produced by the arrangement of the Persian original, in which the quatrains follow one another without regard to

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(*a*) London 1853. See as to these Archbishop Trench in his *Life's a Dream, &c.* London 1856, pp. 120, 121.

sense, but merely according to alphabetic rhyme, is avoided by the device of stringing the selected verses into a kind of eclogue.

After Mr. Fitzgerald's poem the reprint contains the note by M. Garcin de Tassy 'sur les Rubái'yát de 'Omar Khayyám,' Paris, Imprimerie Impériale. 1857. Then comes the article on 'Omar which appeared in the *Calcutta Review,* No. LIX, and is obviously by the same masterly hand as translated 'Omar's *Rubá'iyát.* And lastly we find 'some more of 'Omar's Quatrains,' few or none of which had been previously rendered into English metre. The versions of quatrains in question have at least the merit of literality.

I.

I dashed my clay-cup on the stone hard-by ;
The reckless frolic raised my heart on high :
  Then said the shards with momentary voice :—
" As *thou*, was *I* once—thou shalt be as I."

Annihilation makes me not to fear :
In truth it seems more sweet than lingering here :
  My life was sent me as a loan unsought :
When pay-day comes I'll pay without a tear.

Has God made profit from my coming ? Nay.
His glory gains not when I go away.
  Mine ear has never heard from mortal man
This coming and this going, why are they.

I'd not have come, had this been left to me :
Nor would I go, to go if I were free :
  Oh best of all, upon this lonely earth
Neither to come nor go—yea Not to Be !

I came not hither of my own design,
And I shall go some day—no choice of mine :
  My graceful maiden, gird thyself and serve ;
We must wash down this earthly care in wine.

Yon heaven for our ruin—yours and mine,—
Rolls on to wreck our being—yours and mine.
  Rest on the grass, dear Love—it won't be long
Till grass grows out of *our* dust—yours and mine.

Alas for me! the Book of Youth is read,
The fresh glad Spring is now December dead:
  That Bird of joy whose name was Youth is flown—
Ay me, I know not how he came or fled!(*a*)

II.

Thou art the Opener, open Thou the door:
Thou art the Teacher, teach my soul to soar:
  No human Masters hold me by the hand,
For they are mortal—Thou for evermore.

III.

In school and cloister, mosque and fane, one lies
Adread of Hell, one dreams of Paradise:
  But none that know the secrets of the Lord
Have sown their hearts with suchlike fantasies.

Ah strive amain no human heart to wring;
Let no one feel thine anger burn or sting:
  Wouldst thou be lapt in long-enduring joy,
Know how to suffer; cause no suffering.

IV.

This is the time for roses and repose
Beside the stream that by the meadow goes,
  A friend or two, a Lady like a rose,
With wine, and none to heed how Mullás prose.

Come bring that Ruby in yon crystal bowl,
That brother true of every open soul:
  Thou knowest overwell, this life of ours
Is wind that hurries by—O bring the bowl!

With loving lip to lip the bowl I drain
To learn how long my soul must here remain,
  And lip to lip it whispers, "while you live
Drink, for once gone you come not back again(*b*)."

(*a*) Cf. πόθος δέ μοι ὧς ὄναρ ἔπτη. Bion. ά.

(*b*) Cf. Olivier Basselin, *Vaux de Vire* XVII, 'Les morts ne boivent plus dedans la sepulture.'

Sweet airs are blowing on the rose of May ;
Sweet eyes are shining down the garden gay :
  Aught sweet of dead Yestreen you cannot say—
No more of it—so sweet is this To-day !

This flask was once a lover like to me,
Lost in delight of wooing One like thee ;
  And lo ! the handle here upon the neck,
Was once the arm that held her neck in fee.

Your love-nets hold my hair-forsaken head,
Therefore my lips in warming wine are red :
  Repentance born of Reason you have wrecked,
And Time has torn the robe that Patience made.

V.

Khayyám, who long the tents of Science wrought,
To Sorrow's furnace hath at last been brought :
  Fate's shears have cut the tentropes of his life :
Hope's auctioneer has knocked him down for nought.

Description of two Manuscripts in the Library of the Madras Literary Society.—By the EDITOR.

I.

No. 205 a small quarto, on paper, entitled "A Compend of Miscellaneous Laws of Siam" pp. XII and 147 containing ten lines to a page ; in Siamese with the exception of the Table of Contents, which is in English and as follows :—

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(*a*) From this expression we may perhaps conclude that the scribe, Mr. J. T. Jones, was an American.—*Ed.*

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J. T. Jones.

December 9th, 1835

II.

Folio, on paper, entitled 'Dictionnaire Tamil, François Par Le R. P. Louis Notal De Bourzes, Missionnaire du Maduré,' pp. X and 770, 46 lines to a page: the preface, with all its faults of spelling, accentuation and punctuation, is as follows:—

Ce Dictionnaire contient en pr. lieu les termes qui se trouvent dans le Dictionnaire portugais-Tamul, à la reserve de quelques uns, que j'ai crû devoir rejetter comme fautifs, et de très bas usage, et de quelques autres qu'il est aisé de supplèer en le formant par les règles. il se pourra faire que j'en aurai mit encore quelques uns par mègarde. il sera aisé de les ajouter. en 2e. lieu, on trouve dans ce dictionnaire la pluspart des termes contenus dans les 5 dictionnaires du pais. Ces·5 dictionnaires sont le திவாகரம் [*Divágaram*] qui est le plus ancien de tous. 2e. le நிகண்டு [*Nigaṇḍu*] qui est le plus fameux, 3e. le உரிச்சொல் [*Uric'c'ol*] qui est le plus court. 4e. le பிங்கலம் [*Piṅgalam*] qui est le plus ètendu, 5e, அகராதி [*Agarádi*] qui est le moins exact.

De ces sources vient ce grand nombre de termes, dont ce dictionnaire est composé, nombre que parroit encore plus grand, qu'il n'est en èffe par les variations d'orthographe qui obligent souvent à placer un même terme en 3 et 4 endroits diffèrents. Cette multitude de mots ne doit pas plus nous èffrayer, que nous ne nous èffrayons du grand nombre des mots latins qui sont dans Calopin, on n'est pas obligé à les sçavoir tous, mais il est avantageux d'avoir un livre, où l'on puisse trouver la signification de ceux qu'on ne sçait pas encore ; quand on les trouve, soit dans le

discours, soit dans les livres; C'est pourquoi je suis persuadé qu'il aura plus à ajouter à ce dictionnaire, qu'à y rètrancher. Le R. P. Antoine de Provence, autour du dictionnaire Portugais-Tamul, a rejetté les termes poëtiques, par ce qu'ils sont de peu d'usage. il devoit donc, ce me semble, rejetter par la même raison, quantité des termes Samouscroutam [samskrtam], ou Granthoniques qui sont aussi peu d'usage, que les poëtiques, ou s'il a retenu ceux cy, parce qu'ils sont necessaires pour entendre les ouvrages du R. P. Robert Nobilis, il semble qu'il devoit retenir les poëtiques qui ne sont pas moins nècessaires pour e[n]tendre les livres du pays qui prèsque tous sont en vers.

Au terme Tamul j'ai souvent ajouté la manière dont il s'ècrit en Samouscroutam. Ce qui m'a obligé à le faire est 1° parce que c'est toujours petite erudition de sçavoir, et qu'ils sont les mots Samouscroutams et comme ils s'ècrivent en cette langue. 2° parceque selon les lettres, dont un mot s'ècrit en Granthonique, la prononciation Tamule ne laisse pas de varier un peu, je dis un peu, car il ne faut pas croîre que les Tamuls gardent tout à fait la prononciation samouscroutam. pour cette raison le dictionnaire Tamule place la même lettre en plusieurs endroits diffèrents par example, il rapportera la lettre ப au B et au P, la lettre க au D et au T, la lettre ச au C, à l'S &c. en quoi outre que l'auteur s'est trompé plus d'une fois, il a rendu son dictionnaire embarassé; et n'a obvié qu' à demi à l' inconvenient qu' il vouloit eviter. Car s'il est vrai que la lettre க vg. varie de prononciation au commencement du mot suivant la lettre Samouscroutam, il n'est pas moins vrai que la prononciation varie; lorsque cette même lettre se trouve au milieu du mot suivant la diversité des lettres Samouscroutames, aux quelles repond la ditte lettre க. La cause de tout cecy est, que la langue Samouscroutam a au moins 26 consonnes. La pluspart des langues des Indes, comme Telougou, le Canara, le chingala, out rètenus ce même nombre de consonnes, et voyelles, d'où vient que le Granthon se peut fort bien ècrire en Badaga, en Cannara, en Chingala; au lieu que les Tamuls n'ont pris que 18 consonnes; et ainsi ne peuvent ècrire le Samouscroutam avec leurs caractères ordinaires sans une grande confusion. il y a cèpendant un Alphabet fort approchant du Tamul, dont on se sert au Maduré pour ècrire le Granthon, et c'est celui dont je me sers, on peut l' apprendre trés aisèment autant qu' il est nècessaire pour la fin, que nous prètendons, qui est de sçavoir le Tamul, et la cause pour quoi la même lettre varie tant de prononciation, soit an commencement, soit au milieu de la diction, et quelque fois même de signification. Pour l'ordre des lettres comme ceux qui font des dictionnaires Grecs suivant l'ordre de l'alphabêt Grec; composant un dictionnaire Tamul, j'ai crû devoir suivre l'ordre de l'alphabêt Tamul. Prèsque tous conviennent aujourd'hui, que c'est le moins embarassant, et il ne coute pas beaucoup de s'y accutumer. J'ai mis à la fin comme étrangères les lettres Samouscroutams; celles seulement, qui sont presque gènèralement reçues dans le Tamul, leur donnent entre-elles le même ordre, qu'elles tiennent dans l'Alphabet Samouscroutam.

Comme l' எ , et l' ஒ soient breves, soient longues, s'ècrivent avec le même figure, il les a fallu placer sèparement En pr. lieu l' எ brêf, et en 2° lieu l' எ long, aussi que l'a fait l'auteur de l' அகராதி Tamul, quoique celà soit incommode, il l'est encore plus de n'avoir pas de marques pour connoître si l' எ ou l' ஒ sont brèves, on longues. Dans quelques dictionnaires manuscrits portugais on a marqué les brèves et les longues selon notre manière d' Europe. Mais les copistes s'y trompent aisèment. j'ai été cèpendant obligé d'user de cet artifice, lorsque l' எ, ou l' ஒ se trouvent au milieu de la dictionnaire.

Vous aurez dejà remarqué combien le manque de figure pour marquer la lettre அ. lorsqu'elle suit la consonne cause de confusion. j'ai taché d'y rèmedier en mettant un zèro sur la consonne, lorsqu'elle se doit lire sans அ. vg. பல் doit se lire Pal. et non pas *pala.* au contraire j'ai souvent mis un chèvron sur la consonne qui se doit lire avec A vg பல̂. doit se lire *pala.* La figure ா est encore plus equivoque, pour eviter en partie la confusion qu'elle cause j'ai souvent usé de la lettre ou figure Samouscroutam ர, lorsque c'est un R est marqué d'une petite ligne lorsqu'elle ne sert qu'à marquer l'A long.

Pour le sens que j'ai donné aux termes, j'ai suivi ordinairement le dictionnaire portugais quand je n'ai pas eu des raisons particulières pour m'en ècarter, et quant aux termes qui ne se trouvent pas dans les dictionnaires du pais je leur ai donné le sens que l'usage, et les gens du pais que j'ai consulté, m'ont enseignés. je me serai trompé sans doute plusieurs fois. ce sera à vous Mes R. R. P. P., et à vos successeurs à profiter du peu que vous trouverez de bon, et à corriger peu à peu ce que vous trouverez certainement etre défectueux. je dis le même par rapport aux califications que j'ai mis à certains termes. Vous entendrez assez que *us.* signifie *Usité, Rec,* ou *Erud.* d'usage parmi les sçavants seulement, que *ign* ou *inc,* signifie que ce terme m'est inconu, et à ceux que j'ai consulté. *Mad., Marr., Trav., Com., Malab.,* marque que ces termes sont d'usage au Maduré, au Marrava, à Travancor, vers le cap Commorin, au Malabar. P, Poët., que c'est un terme poëtique plus usité en poësie que dans la prose vulgaire, toutes cettes qualifications ne sont nullement des arrêts irrevocables, au contraire je conseille fort à nos R. R. P. P. de lire ce dictionnaire avec des personnes intelligentes, et de s'en tenir plutôt à ce qu'elles diront qu'à ce que j'ai marqué. Un terme est souvent connu, usité, de bon usage, honnête dans un pais, qui a 15 lieus de là sera inconnu, inusité, de bas usage, et malhonnête, autant qu'il m'a été possible je m'en suis tenu à l'usage du Maduré. Dans la Mission du Carnate, il y aura sans doute bien des termes particuliers qu'il faudra ajouter, et qualifier autrement.

Regardez donc cet ouvrage comme une ebouché, il y a beaucoup à rètoucher. dans le cours de ce dictionnaire vous trouverez quantité des fautes contre la langue françoise. Ceux qui sçauront qu'il y a plus de trente ans que je ne parle guère que Portugais, ou Tamul, me le pardonneront aisèment, Vous trouverez aussi quelques mots Latins; quelques uns me sont echappés par l'habitude où j'etois de composer de Tamul en latin. Je n'ai mis d'autres parce que le mot françois ne me venoit pas, d'autre par modestie pour ne pas user de certaines expressions françoises peu honnêtes, d'autres par ce quelles m'ont paru plus précises et plus courtes.

Je distingue comme trois dialectes dans cette langue. La pre. d'un Tamul Samouscroutam pour ainsi dire, tel que le parlent plusieurs Brahmes, et Ecrivains des Princes, qui mettent le plus qu'ils peuvent des termes Granthoniques. le R. P. Robert Nobili suit en partie cette dialecte; la 2e. de Tamul rigide, c'est à dire, de ceux qui n'usent jamais, ou prèsque jamais de lettres Granthoniques; qui diront plustôt மொக்கம் (mokkam) que மொக்ஷம் (moksham) இலக்குமி (ilakkumi) que லக்ஷிமி (lakshimi) etc. Ceux ci suivent exactement la Grammaire, et encore plus exactement l'orthographe Tamulique, et usent volontiers de termes tirés de Dictionnaires du païs, quoique d'ailleurs peu usités, c'est le செந்தமிழ், (sen-tamiḻ) ou le Tamul sublime; la 3e. est la courante parmi ceux qui parlent bien, comme sont les Vellales qui ont etudié, et qui ont mérité le nom de வாற்றைத்தொழிலோர் (várattaidoḷilor). Ceux ci employent sans cèrèmonie les termes les plus clairs, les plus usités des autres dialectes. ils reconnoissent l'usage pour le pr. Maître des langues, parlant pour être entendus ils proportionnent la maniére de s'exprimer à la portée de ceux, à qui ils parlent, ou pour qui ils composent evitant, cèpendant de se servir de termes bas, et impropres.

Je crois qu'il est bon, et quelque fois nècessaire de sçavoir quelque chose des deux prèmiers dialectes, mais que dans nos discours, dans nos exhortations, et dans les livres que nous composons, c'est uniquement â la 3e. que nous devons nous en tenir. Je ne sçais même si le contraire, n'est point un artifice du Dèmon pour empêcher que nos livres ne fassent du profit. Je dis cecy surtout â l'occasion d'un livre composé à Ceylam, dans le quel l'auteur semble avoir choisi exprès les termes les plus obscurs, les tirant tantôt du Samouscroutam, et tantôt du Tamul sublime-quoiqu' assez souvent il retombe dans le Tamul le plus rempant avec beaucoup d'impropriétés.

Je rapporte ordinairement les prèterits en தென்(tén), et en த்தென் (ttén), plutôt que les prèterits en சென் (sén), et en ச்சென் (ssén), non que je condamne ceux cy: mais parceque les pres. sont plus elèguants, et à peu près aussi claires. il n'en coute pas plus de s'acoutumer au plus éléguant. Je dis le même de quelques autres comme de பார்த்தேன், (parttén) வளர்ந்தேன், (valarndén), &c. &c.

Vous trouverez plusieurs வ marqués d'une croix, c'est une marque que ces வ sont inserés pour l'Euphonie seulement, selon les règles de l'orthographe sçavamment expliqués dans la Grammaire du R. P. Constance Joseph Beschi. Si vous trouvez une petite ligne entre deux mots Tàmuls, c'est marque que pour ne pas faire d'embarras, je me suis dispensé de suivre l'horthograph rigoureuse, que très peu de gens observent; ou bien que ce sont deux mots différents. Si vous trouvez une apostrophe, c'est marque qu'il se fait là quelque Elision.

Quelque long que soit cet ouvrage, ce n'est cependant que l'abrégé d'un autre plus long; où je marquois les Synonimes, et certaines enumèrations qu' on trouve dans les Dictionnaires du Pais, comme le R. P. Beschi les rapporte dans son dictionnaire poëtique. Je renvoye souvent à ce dictionnaire et s'il arrive que ce que je rapporte, qu'on s'en tient plutôt à lui qu' à moi.

Voylà Mes R. R. P. P. de quoi j'ai crû devoir vous avertir au commencement de ce Dictionnaire; il ne me reste qu'à vous l'offrir, comme je le fais très humblement, vous priant de vouloir bien me donner un peu de part dans vos N. N. et dans vos travaux Apostoliques.

LOUIS NATAL DE BOURGES. T.

On the Origin of the Sanskrit Linguals. By DR. GEORGE BÜHLER, *Professor of Sanskrit in the Elphinstone College, Bombay.*

IT is a widely spread opinion amongst philologists that nearly all those Sanskrit letters, which are usually designated 'Cerebrals,' owe their origin to foreign influence. We sometimes find it simply stated, that the Sanskrit-speaking Aryans borrowed them from the languages of the aborigines of India. Other writers have better formulated this idea, and supposed that these letters found their way into Sanskrit out of one of the Dravidian languages. The latter opinion is also advocated by Dr. Caldwell in his admirable comparative grammar of the Dravidian languages, where we find a short and able summary of the arguments, which have been or can be brought forward for it. In order to prove this hypothesis and at the same time to disprove the possibility of the Dravidians having borrowed the cerebrals from Sanskrit, he adduces the following reasons.*

1. The cerebral consonants are essential component elements of a large number of Dravidian roots, whilst in Sanskrit they are mostly deduced from dentals by euphonic changes.

2. None of the cerebrals consonants have ever been discovered in any of the primitive languages which are related to the Sanskrit, viz., the classical languages, the Gothic, the Lithuanian, Sclavonian and Zend. But Sanskrit, which came into contact with the Dravidian and other Scythian languages, abounds with them.

3. Tamil softens harsh consonants, as sh, which are borrowed from Sanskrit. If therefore the cerebrals were bor-

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* Comp. Gram., p. 111. ff.

rowed by the Dravidians from the Sanskrit, Tamil at least would have altered them.

4. Tamil, which of all Dravidian tongues came least into contact with Sanskrit, uses them most frequently—a circumstance incompatible with the supposition of the derivation of the cerebrals from Sanskrit.

Dr. Caldwell, I think, has proved two things beyond all doubt; 1stly, that the so called cerebrals—or as we shall term them henceforth, *linguals*—of the Dravidian dialects are *not* derived from the Sanskrit; and 2ndly, that they did not belong to the original sounds of the primitive Indo-European tongue.

But I cannot allow, that he has established sufficiently his own assertion, viz., that the Sanskrit linguals owe their origin to Dravidian and Scythian influence. For he has forgotten to prove, that sounds *can* be or *are* introduced from one language into another, and to show, how the migration of the linguals from Dravidian into Sanskrit was effected. As the case stands, a stickler for the purity of Sanskrit might start another hypothesis—that the Sanskrit might have developed independently the sounds in question just as the English has done with its palatals. Likewise a full discussion of the origin of the laws according to which the greater number of the Sanskrit linguals is produced from dentals, through the influence of a preceding r, ṛi, ṛî or sh, would have been highly desirable. Lastly, Dr. Caldwell's statements contain a little error in point of fact. He says "*none* of the cerebrals (linguals) have ever been discovered in *any* of the primitive languages which are related to Sanskrit (Indo-European)." This is perfectly true in regard to ṭ, ṭh, ḍh, ṇ *(b.)* But the Sanskrit r, ṛi, ṛî and sh are according to the testimony of the grammarians and of the pronunciation of the modern Paṇḍits, likewise lingual :

the second and fourth of these sounds are found in Zend exactly in the same words and forms as in Sanskrit, and the first is common to all the Indo-European languages.

These objections require a fuller exposition. Regarding the first point, that the possibility of the borrowing of sounds by one language from another has not been proved, it would be unjust to throw the blame of so important an omission entirely on Dr. Caldwell. It is a common fault of comparative philologists that they admit loan-theories too easily, without examining the facts. Max Müller has combated, very justly, I think, the prevalent opinion, that grammatical laws can be or ever have been introduced from one language into another. Regarding the borrowing of sounds, it may suffice for the present to remark that it never has been shown to occur in the languages which were influenced by others in historical times, such as English, Spanish, and the other Romance languages, Persian, &c. Let us consider the case of the English. Though half of its words have been imported by the Norman race, though most of the old Saxon inflections have perished in the struggle between the languages of the conqueror and the conquered, though in some instances even Norman affixes have entered the organism of the original language, the quietism of the Saxon organs of speech has opposed a passive and successful resistance to the introduction of foreign sounds. The English has received neither the clear French 'a,' nor its 'u,' nor its peculiar nasals. On the contrary it has well preserved its broad, impure vowels and diphthongs, and it is now as difficult for the Englishman to pronounce the French 'a' or 'u,' as it was for his Saxon ancestors eight hundred years ago. But we find still stronger evidence against the loan-theory in the well-known fact, that nations which, like the Jews, the Parsees, the Slavonian tribes of Germany, the

Irish, etc., have lost their mother-tongues, are, as nations, unable to adopt with the words and grammatical laws, also the pronunciation of the foreign language. They adapt its sounds to their own phonetic system, and their peculiarities are recognisable even after the lapse of centuries.

As to the second point, it is certainly not sufficient simply to state, that the linguals were borrowed by the Aryans from the Dravidian tongues. It ought to have been proved that those conditions, under which alone the introduction of a foreign sound into a language is imaginable, really existed in Sanskrit. These conditions are, that a great number of foreign words containing the particular letter should first be borrowed, and that the sound should thus become perfectly familiar to the people. It ought therefore to have been proved that the Sanskrit already in the earliest times, possessed a large number of Dravidian loan-words containing linguals. But such an attempt has never been made, and it would, I fear, be quite fruitless. Dr. Caldwell enumerates in his list of Sanskrit words, which he supposes to have been borrowed from the Dravidians, only *sixteen nouns* which contain linguals, aṭavi, aṇi or âṇi, kaṭu and its derivative kaṭuka, kuṭi and its kindred kuṭira, kuṭera, kuṭumba, kuṇi or kûṇi, koṭa or koṭṭa, khaṭvâ and paṭṭa or paṭṭana.* *Two* of these only, âṇi and kaṭuka, are found in the Rigveda, which is generally acknowledged to be the most ancient literary production of the eastern Aryans, and the Dravidian origin even of these two is very doubtful. For âṇi, 'the pin of the axle of a cart', can according to the analogy of pâṇi 'hand'=parni from the root pṛi, and others,† be very well supposed to be derived from the root 'ar' which, as its causal arpayati and the corresponding Greek verb *ᾰ̓ρ-αρ-ίσκω* prove must have meant in the primitive Indo-European language ‘to fit or to make to fit.’ The etymological meaning of arṇi=âṇi would therefore be “a thing to be fitted (into some other thing.”) (Compare also ara ‘a spoke’ which is derived from the same root). Kaṭu ‘sharp’ probably stands for kartu, like nâṭayati for nartayati, and seems to be derived from the root kṛit ‘to cut.’

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* Comp. Gram. p. 439, ff.

† See below.

But even if Dr. Caldwell’s opinion regarding the origin of all the sixteen words were correct, and even if they were found in the most ancient dialect of Sanskrit, is it likely that so small a number of words should have caused the production of thousands of Sanskrit linguals? I think there is a better way of solving our problem, and it is indicated by the third point which I brought forward against Dr. Caldwell’s opinion. As the Bactro-Indian language contained at least three linguals, the consonantal and vocalised, ‘r’ and sh, and as it can be shown that by far the greater number of Sanskrit lingual mutes and nasals is produced either by the direct change of ‘r,’ ‘sh’ into linguals or by the change of dentals into the corresponding linguals through the influence of ‘r,’ ‘ṛi’ ‘rî’, sh, we are driven to conclude, that the latter letters originally caused the production of the lingual ṭ, ṭh, ḍ, ḍh, and consequently that lingualisation is entirely an Aryan proceeding rooted in the ancient phonetic system of the language. On further investigation it will however appear, that the letter ‘h’ and in rare cases also ‘l’ undergo similar changes as r and sh, and that in a very limited number of words linguals have been substituted for dentals without any apparent cause whatever.

I shall now turn to an examination of the facts in order to show that they fully bear out my assertions.

Regarding the relation of 'r' to the lingual mutes and nasal, firstly it is changed to ḍ, in anaḍvah, 'an ox.'[*] This word apparently is a compound formed by anas, 'a cart', and vah 'drawing' from the root, vah 'to carry' to draw a carriage. According to the phonetic laws of the classic Sanskrit, anas + vah ought to have become anovâh. In the Vedas however a final s—or, as the Hindú grammarians say, a visarga—preceded by 'a' and followed by a soft letter is frequently changed to 'r.'[†] Thus we find usharbudh, 'early awake' for ushobudh, vanargu 'a thief' for vanogu, literally 'going or prowling about in the wood.' Anas + vâh could therefore easily become anarvah and further be corrupted into anaḍvah, as 'r' is a lingual and being a soft letter corresponds to ḍ. The instance is, as far as I know, unique. Secondly, the consonantal 'r' as well as its two vocalised forms 'ṛi,' 'ṛî' regularly cause (by assimilation) the change of a following dental 'n' to lingual 'ṇ,' if they precede it either immediately or are separated from it by vowels, diphthongs, gutturals, labials, n, m, y, v, h. At the same time the 'n' must be followed either by vowels, dipthongs, or n, m, y, v. The numerous further modifications, which this rule undergoes, will be found in detail in Benfey's Vollstændige Sanskrit Grammatik, § 23, ff. It may be safely said, that seven-tenths of all the linguals thus owe their existence to the principle of assimilation.

But there are some cases in which, through further phonetic changes, it becomes very difficult to recognise that a lingual 'ṇ' has been produced through the operation of the above described rule. For according to another phonetic law, which seems to have taken effect only irregularly in Vedic and classical Sanskrit, but has later become stringent in the Prakrit dialects, an 'r' immediately preceding an 'ṇ' must be assimilated to the latter. In the Prakrit dialects of the dramas an ṇṇ thus produced remains unchanged, e. g. kaṇṇo 'the ear' for karṇaḥ. In Sanskrit, however, as well as in some of the vernaculars, the first ṇ is dropped and a preceding short vowel may be lengthened. Thus we find in the Rigveda dûṇâça 'imperishable' for durṇâça, and dûṇaça, 'difficult to obtain' for durṇaça. In both these cases either form actually occurs. Âṇi 'the pin of the axle of the wheel,' which I believe to be derived from the gunated form of the root 'ṛi,' 'ar,' by the affix 'ni,' as well as pâṇi 'hand,' are other instances of this change, common to the Vedic and classic Sanskrit.* The latter word 'pâṇi' seems to stand for 'parṇi' and to be derived from the root 'pṛi,' 'to transact business, act' just as kara 'hand' from kṛi 'to do'. More frequently however the first ṇ of the group ṇṇ deduced from 'rṇ' is simply dropped, as in the roots ghuṇ, cuṇ, cûṇ, puṇ, pûṇ for ghûrṇ, cûrṇ and pûrṇ. The û of the roots pûrn etc. is originally short and is lengthened in consequence of a special rule in Sanskrit. This accounts for the double forms c′uṇ and ç′ûṇ. The ṇ of aṇi, a rarer form for âni, of aṇu 'small,' paṇ 'to buy and sell' seems to owe its origin to the same source.

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[*] Compare also Rigvedaprâtiçâkhya I. 1, 30, ff. and Benfey's Vollstændige Skt. gram. s. 109, A. 2.

[†] This explanation of the word has already been given by the native grammarians, See V. S, Sanh. prât. III. 44.

Aṇu, I think, is derived from an Indo-European root, 'ar' 'to hurt,' 'to grind,' from which the Sanskrit îrma, arus 'wound' are derived and which in Greek is represented by 'al' in ἀλέω to grind, ἄλευρον 'flour.' The etymological meaning of aṇu (arṇu) would therefore be 'diminished by grinding,' (compare the Greek τερεν· from τείρω=Latin tero.) Regarding paṇ it seems to be derived from an Indo-European root par, which is preserved in the Sanskrit pṛi 'to transact business' and in the Greek περ-νημι "I sell." Its older form must have been parṇ. The noun baṇij or vaṇij 'a merchant' is without doubt a derivative from this root formed by the affix ij, like uçij etc. and its ṇ likewise has been produced by a lost 'r.' The change of the initial 'p' to 'b' or 'v' finds its analogies in the present of the root pâ, pibâmi or pivâmi for pipâmi and the causal of sphây, sphâvaya, sphâpaya.

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* Many of the following conjectures have already been brought forward by other philologists, especially by Benfey and Boethlingk and Roth. See Benfey's Vollst. Skt. gram. ss. 121, ff. B. & R's Skt. dictionary, s. vv.

But the lingualising influence of 'r' extends still further. It causes also the change of dental mute letters into linguals. This change most frequently takes place in the Prakrit dialects of the dramas, in Pâli, in the language of the Rock Inscriptions and in the modern vernaculars. The rules, by which it is regulated are :—

1.) Mute dentals are changed to the corresponding linguals after 'ṛi,' and ṛi itself becomes a, i, e, or u. Skt. krita = kaṭa or kiṭa, Skt. vṛiddha = vuḍha, tâlavrinta = talaveṇṭa.

2.) Mute dentals are changed to the corresponding linguals if preceded by r immediately. In this case the 'r' either may be assimilated to the following lingual, or it may be rejected, and in the latter case the preceding vowel may be lengthened. Skt. vartate = vaṭṭate, bhartâ = bhaṭṭâ, gardabhaḥ = gaḍḍaho, kartavya = kaṭavya, vardhaya = vâḍhaṇe,ṃ vâdha-vuṃ.

It has been frequently asserted that these and similar changes are innovations introduced in the course of the development of the Indian languages and that they are unknown to the ancient mother-tongue. But in this, as in many similar cases, it will be found on closer investigation, that those laws which rule paramount in the secondary and tertiary Indian languages, began to show their influence already in the most ancient forms of East-Aryan speech. Firstly, the Vedic dialect contains a number of words, which exhibit the phonetic changes just described. We find there kâṭa, for karta, dûḍabha for durdabha, dûḍâca for durdâça dûḍhî for durdhî and kuṭa for kṛita.

Secondly, the classical Sanskrit likewise possesses many forms, which have been affected by the Prakrit laws of change. But it is impossible to speak of them with the same confidence as to the Vedic words, since in most cases only one, the altered form, has remained in use, or the two forms differ in their meanings.

Thus nâṭayati, 'he dances, he acts,' stands for nartayati. Bhaṭa 'to support, to hire,' is apparently a denominative from the participle perfect of bhṛi, bhṛita 'supported, hired.' Kaṭu 'sharp,' probably stands for kartu (see above) and is derived from kṛit 'to cut.' From the same root, I think, kaṇṭa 'thorn' is derived, where the n of kṛit reappears as in kṛintana. Taṭa 'the bank of a river,' perhaps is derived from the root tṛî 'to cross over' and corrupted from tarta : compare pâra 'bank' from pârayati 'he crosses over.' Vâṭa 'garden,' 'plantation' from root vṛi 'to enclose,' standing for *varta.*

Further we find numerous offshoots of the root tṛid 'to strike, to destroy, to split,' in which the 'd' has been lingualised :—

1.) The two verbs taṇḍate and tâḍayati=(tardayati) 'he beats.' The 'ṇ' of taṇḍ is explained by the present form of tṛid, tṛiṇatti.'

2.) Taḍit 'lightning' (compare the German Schlag, Wetterschlag)

3.) Taṇḍula 'grain especially ricegrains, (compare Latin grânum=Gothic kaúrn, English corn, which apparently are derived from the root gar, Sanskrit jṛî, conteri.

Another instance of a d changed to ḍ through the influence of a preceding ṛi, r seems to be 'muṇḍ,' to shave, which, I think is a corruption of mṛid 'to rub.'

There are also examples of ḍh taking the place of dh e. g, in âḍhya, which apparently stands for ardhya and is derived from the root ṛidh 'to increase.'

But it seems that 'r' exercises its assimilating influence on following mute dentals, not only when it precedes them immediately, but also just as in the case of 'n,' when it is separated from them by a vowel. This I think, has been the case in puroḍâça 'a flour cake offered to the gods,' the latter part of which apparently contains a derivative from the root dâç, 'to offer.' Paṭh 'to recite' which by some scholars is considered a Prakritic corruption of prath 'to extend, to *praise*' may be quoted as another instance, (compare the Latin representative of this root 'pret' in 'interpretari."

Lastly we find a number of words in which a mute dental becomes lingual through the influence of an immediately following 'r.' Thus we find in the Veda vikiridra and vikiriḍa—the 'r' regularly disappearing in the lingualised forms. In classical Sanskrit we have caṇḍa 'passionate, hot,' which doubtlessly stands for candra 'resplendent, glowing,' (Compare the metaphorical use of English 'glowing' German gluehend.) Another instance is meṭha 'elephant-driver' for mahâmâtra, (compare Prakrit mahâmettha.) To these, I think, belongs also daṇḍa, 'stick, punishment,' whose ḍ however seems to represent an original 'tr.' This word finds a convenient etymology, if we derive it from the root dam "to coerce, to tame" and the affix tra, which designates the instrument, and suppose it to stand for dantra "instrument of coercion." Regarding the change of 't' to ḍ compare the Prakrit gaḍḍo for garta.

We now come to 'sh (ष),' the fourth letter which helps to swell the numbers of the linguals. 'Sh,' firstly, whether radical or a substitute* for ch, ç, çc, x, or j, becomes ṭ, if it is the final of a word or if it immediately precedes the 's' of the termination of the locative plural or hard consonants except 't,' 'th' and s. Before soft consonants it is changed to ḍ, and if the following consonant is 'd,' or 'dh,' which are the initials of a grammatical termination, these letters likewise become lingual.

Ex. 1.) Dvish nom. sing. dviṭ, loc. plur. dviṭsu: upayaj l. plur. upayaṭsu ºprâch l. plur. ºprâṭsu.

2. prâch + vivâka = prâḍvivâka, dvish + dhi = dviḍḍhi 2. pers. sing. imp. Par. veviç + dhi = vevish + dhi = veviḍḍhi: pâprach + dhi = pâprash + dhi = pâpraḍḍhi: cax + dhvam = cash + dhvam = caḍḍhvam 2 pers. plur. imp. Ât.

Sometimes one of the two soft linguals produced according to the above rule is rejected and then a preceding 'a' becomes 'o,'† other vowels may be lengthened. Thus shash + daça makes shoḍaça instead of shaḍḍaça, shash + danta shoḍanta ‡ instead of shaḍḍanta, and shash + dhâ either shaḍḍhâ or shoḍhâ. Similarly 'nîḍha,' as the corresponding Gothic 'nist' and English 'nest' prove, stands for nishḍa, niḍḍa. It is most probably derived from the root sad 'to sit' with prefix 'ni, 'down,' and the old nisada meant literally "a place for sitting down(*a*)." Also the root pîḍ 'to torment, to squeeze' seems to have undergone a similar change, as it appears to be contracted from pi + sad 'to sit upon.'§ The prefix 'pi' is the mutilated form api and occurs also in pi-dhâna, pi + dhâ, pi-shṭap. Instances of the simple loss of the first lingual occur in the second persons plural Âtmanepada of the so called fourth and fifth Aorists and of the reduplicate perfect.

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* It is commonly said, that "x, çc, ç, ch and j are treated as if they were sh." But in reality these letters were first changed to 'sh' and then to 't' and 'ḍ,' Pâṇini VIII, 2, 36 adopts also the latter view. For the full details on the subject see Benfey Vollst. Skt. Gr. § 66.

† Compare soḍhâ = sah + tâ and âshâḍha = âshah + ta.

‡ See Vâj. Sanh. prât. III, 46.

(*a*) But compare the Slav. gnêzdo, the first syllable of which the late Dr. Siegfried thought might be = γένος GANAS.—*Ed.*

§ Compare Greek πι-έζω = πι-ἐδ-γω.

The termination of the second person plural Âtm. aorist is 'dhvam,' which, if attached to a verb ending in a diphthong or a vowel other than a, â, must become 'ḍhvam,' e. g. stu makes a-sto-ḍhvam, nî, a-ne-ḍhvam. The reason of this change is, that, as the fourth aorist is formed by combining the root with the unaugmented forms of the imperfect of the verb as, 'to be,' the termination dhvam stands for sdhvam. This form being preceded by i, î, u, û, ṛi, ṛî or a diphthong must be changed first to shḍhvam and next to ḍḍhvam according to the above rule. The latter form ḍḍhvam becomes ḍhvam by the rejection of the initial ḍ as in shoḍhâ. The rule regarding the change of 'dhvam,' dhve is less strict in the two other cases mentioned, but based on the same principles as in the fourth aorist. For the details compare Benfey Vollst. Skt. Gram. § 830, Bem. 2, § 847. Bem. 2, § 850, Bem. 2, where the explanation of these forms is also given. It ought to be observed that this change of 'sh' to 'ṭ' stands in strict analogy with that of 's' to 't' e. g. vas + syâmi makes vat-syâmi, avâs + sît, avât-sît, ukha + sras ukhasrat, parṇa + dhvas, parṇadhvat,* âs + dhvam, âddhvam. In either case the production of ṭ and t is caused by the disappearance of the sibilant element of the sh and s under peculiar conditions. The second mode in which 'sh' causes the production of linguals needs little comment. The rule is simply this, that 'n' preceded by 'sh' becomes ṇ under the same conditions as if preceded by r, ṛi or ṛî.

Thirdly, hard dentals preceded immediately by 'sh' whether radical or a substitute for ç, ch, x, çc, or j, are changed to the corresponding linguals.

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* This word is mentioned by Çâkaṭâyana I, 2, 72.

Ex. tush + ta = tushṭa, upari + stha = uparishṭha, mârj + ti = mârsh + ti = mêrshṭi, acax + thâḥ = acash + thâḥ = açashṭhâḥ, viç + ta = vish + ta = vishṭa.

In Prakrit, Pâli and the Vernaculars shṭ, and shṭh, thus produced, become ṭṭh or ṭh : e. g. drishṭi makes diṭṭhê, nishṭhura ṇiṭṭhura, pṛishṭha, puṭṭha. In Sanskrit we find, as in the cases of rt, rṇ formerly mentioned, several instances of the working of this law. Thus jaṭhara, belly, stands as its Greek equivalent γαστήρ proves, for jashṭara, originally for jastara. Regarding the change of 's' to 'sh' after 'a' compare â-shâḍha from the root sah and avashṭambha for avastambha from the root stambh. In a similar manner many of the roots in 'ṭ' and 'ṭh,' which we find side by side with roots in ç or sh, seem to have originated by a 't' being added to the roots ç, sh,[*] and the final groups, shṭ, shṭh, undergoing the change referred to. Instances of this kind are ghaṭṭ 'to shake, to move,' which seems to be derived in the manner described from ghṛish 'to move, to rub,' ruṭ 'to be angry' = rush 'to be angry,' çuṭh 'to desiccate = çush 'to dry."

The fifth letter which may be turned into a lingual, and causes the change of dentals into linguals, is the letter 'h.' It becomes frequently ḍh, which if standing at the end of a word or followed by the 's' of the locative plural, is hardened to ṭ, e. g. mîḍhvân, 'giver of rain' seems to stand for mimihvân part. perf. Par. of the root 'mih,' bhâravâh makes in the nom. sing. bhâravâṭ, madhulih in the loc. pl. madhuliṭsu.[†] The same change of 'h' to 'ḍh' is also frequently effected, if an affix beginning with t, th, d or dh is joined to a root ending in h. But then the ḍh together with following dental, which ought to become ḍḍh,[‡] makes ḍh only.

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[*] The addition of 't' to roots is frequent in Sanskrit e. g. in dyut = div + t, veshṭ = vesh + t, yat = yam + t, vat = van + t. In these cases both forms occur.

[†] Compare Benfey Vollst. Gram. § 66 I. 5.

[‡] Compare the change of bh + t, th, d, or dh to bdha, etc.

Ex. leh + ti = leḍh + ti = leḍḍhi = leḍhi lih + thaḥ = liḍh + thaḥ = liḍḍhaḥ = lîḍhaḥ lih + dhvam = liḍh + dhvam = liḍḍhvam = lîḍhvam.

The omission of the ḍ, which is analogous to that observed in shoḍaça, shoḍhâ, shaḍanta, is, no doubt, owing to the aversion entertained by the Hindú against the immediate sequence of two lingual mutes.

The change of 'h' to 'ḍh' may at the first look appear surprising, as the former letter is a guttural.(*a*) Nevertheless, I think, it may be satisfactorily accounted for, if we assume that at the time when it first came into use, the Sanskrit already possessed linguals, that it belongs to a later period than the changes produced by r, ṛi, ṛî and sh. It is impossible to prove this assumption strictly; but there are circumstances which make it appear not altogether unlikely. Firstly 'h' is one of those letters, which have been developed in Sanskrit after its separation from the Indo-European sister-languages and even from Zend. It has been produced by a weakening of original 'gh' and in rare cases also of 'bh,' and 'dh.' Secondly, some roots whose h in the classical Sanskrit admits of lingualisation, show in the Vedas forms with gh only. Thus druh makes in classical Sanskrit in the part. perf. pass. drûḍha or drugdha, in the Veda drugdha only. If my premises be granted, the transformation of 'h' into 'ḍh' may be explained by the peculiarly changeable nature of the former sound. 'H' as well as its kindred, the aspirates, are the very Proteuses amongst letters. Sometimes the different branches of the Indo-European tongue exhibit all the three aspirates in one and the same word e.g. in Sanskrit gharma = Greek θερμό-ς = Latin formu-s. In Greek θ and φ are frequently exchanged, and the transition of th into f may be observed in several English dia-

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(*a*) Some Sanskrit grammarians call 'h' urasya a "chest-sound." See Whitney's note to Ath. Veda Prât. I. 19.

lects(*a*). In Dutch and in the Saxon dialects of Northern Germany ch frequently replaces f, e. g. Dutch stichter=H. G. stifter, Low G. and Dutch achter=E. after, Low G. lucht=H. G. luft. In Latin an original dh is replaced by f, e. g. in for-es=θύρα Gothic daúr. In the same language and in Spanish h becomes f. Thus we have hœdus and fœdus, hostis and fostis, hordeum and fordeum, where the corresponding Teutonic words goat, geisz, gasts, guest, and gerste, show that the forms with h (for gh) are the more ancient. The same change of h to f occurs in the Vedic jarbhurâṇa for *jarhurâṇa, pres. part. Âtm. of the freq. of the root hṛi.'(*a*) In Sanskrit 'h' becomes also dh in the word anaḍvah 'an ox,' which makes in the loc. plur. anaḍutsu, in the instr. dual. anaḍudbhyâm, instr. pl. anaḍudbhiḥ, in the dat. abl. plur. anaḍudbhyaḥ. The latter part of the word anaḍvah, as before observed, is derived from the root vah 'to carry,' where 'h' stands for original gh. (Compare Greek Ϝόχος, Gothic vig). Taking then into account the general changeability of 'h' and the predilection of the Hindús for lingual sounds, as well as the peculiarly hollow pronunciation of 'h' in the modern vernaculars, which most probably prevailed also in ancient times, it is, I think, not astonishing to see this letter become 'ḍh.'

Besides the linguals which have originated in the different ways described, a small number are produced by assimilation of dentals to lingual mutes or nasals. Thus the root phan makes in the part. perf. pass. phâṇṭa instead of phânta, and tâṇḍâmarân stands for tân ḍâmarân, 'those Ḍâmaras (accus.) Finally there are a good many words in which dentals have been changed to nasals apparently without any

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(*a*) E. g. fyrst for *thirst* Coleridge Gloss.2. *Afingred* ' a-hungered (Legend of S. Brandan p. 20 and *Piers Plouhman* ed. Wright p p. 133, 176, 283, 403) and *frefound* grey-hound, are examples of f for h—*Ed.*

* The reduplication jar, shows that the base is hṛi and not bhṛi, as sometimes has been supposed.

cause whatever. We find, for instance, darvâghâṭa, carvâghâṭa for — ghâta, the roots bhaṇ for bhan (comp. φων-έω), paṇ 'to praise' for pan, veṇ for ven. In these and numerous other words the form with the dental generally belongs to the Vedic language. The existence of the double forms, etymology and the results of comparative philology prove that the dental sounds are the more ancient, and also that no external cause produced their transformation. But we may safely conjecture that the gradually increasing predilection of the Hindús for lingual sounds is the true reason of these changes, since it is a fact, very frequently observable in the history of languages, that a phonetic innovation outgrows in course of time its original and legitimate limits. Thus in Prakrit every final m or n, which is not dropped, must be changed to anusvâra, whilst in Sanskrit this change takes place only if certain letters follow. Again in French an original 'c' followed by 'a' becomes a sibilant, sh, though the conditions, which caused the analogous transition of 'c' to ç, ch, before i and e, do not exist here. It is the general predilection of the Romance languages for palatals which produced this otherwise inexplicable phenomenon.

So much for the facts offered by the Sanskrit language in favour of my theory. We have seen that the ancient linguals 'r' and sh produced lingual mutes and nasals, either independently or assisted by the universal laws of assimilation, and that also ṛi and ṛî, the two lingual vowels, the former of which at least belongs to the Pre-sanskritic period, brought about the same result. Hence the Hindú contracted a liking for these sounds and changed not only 'h,' which on account of this changeable nature easily lent itself to this proceeding, to 'ḍh,' but also dentals to the corresponding linguals. Moreover I have pointed out repeatedly, how the predilection for linguals becomes stronger and stronger in course of time, how in the daughter-languages of Sanskrit and in their daughters laws which cause the production of linguals become more and more stringent.

One objection I must confess, may be made to my theory, namely, that I have not succeeded in accounting satisfactorily for *all* the Sanskrit linguals. But it was not my intention to examine all the Sanskrit words containing these sounds, but only to explain by far the larger number of vocables in which linguals occur, and especially the laws which in actual Sanskrit regulate their production. Moreover there can be no doubt that the want of historical documents, which could illustrate all the successive stages of the development of the language, will for ever prevent us from finding satisfactory etymologies for each of the words in question.

But as one of my principal objections against the loan-theory arose from its not being tested by the application to other cases, it would be unbecoming to conclude my paper without at least attempting this. Besides the probability of the theory advocated by me would be considerably enhanced, if it could be shown that languages other than the Sanskrit have independently developed sounds of the lingual class. I think that analogous cases can be adduced even from the limited range of Western Indo-European languages, with the pronunciation of whose sounds I am familiar.

In the ancient Indo-European tongues, spoken in the West, lingual nasals and mutes seem to have been unknown. At least we have no direct evidence to the contrary. But in modern times various Teutonic and Sclavonic dialects have developed a good many. Richer in linguals than all the other modern languages known to me, is the English, which at present has completely lost its unaspirated dentals. It is true, they still go in the grammars by this name, which they have long ceased to merit, and many Englishmen.

I fear, will strongly protest against the truth of my observation. But some English writers have recognised the existence of linguals in their own language. Thus Professor H. H. Wilson says in his Sanskrit grammar p. 3 :

" The (Sanskrit) consonants are in general prononuced as in English, and we have, it may be suspected, several of the sounds for which the Sanskrit alphabet has provided distinct signs, but of which signs are wanting with us. This seems to be the case with the nasals and the *cerebrals.* We write but one ' n,' but we vary its articulation according, according to the consonants it precedes, as a guttural, palatal, cerebral, and dental, in such words as ' conquer,' ' singe,' ' none' and ' content.' So we write but one ' t' and one ' d,' but their sounds differ in such words as ' trumpet,' and ' tongue,' ' drain' and ' den :' in the *first* of which they are *cerebrals,* in the *second,* dentals."

I do not think that any man is a good judge to decide the question whether his pronunciation of the sounds of his native language agrees perfectly with the spelling. One constantly hears the most curious assertions on this subject. I have met well-educated people in Germany who firmly believed that they pronounced the impossible group 'dt,' e.g. in ' *Stadt,*' and nobody but a phonetologist can be brought to understand that the High-German possesses two 'g,' one guttural and one palatal sounding like gy e. g. in 'gab,' and 'geben,' or that 'k' in German is slightly aspirated and pronounced nearly like ' kh.' Though it is therefore interesting to learn that Englishmen have observed the existence of linguals in their language, I cannot adopt their opinion so confidently as that of a foreigner whose mother-tongue has dentals as well as linguals distinctly marked. The proper persons then to decide the question are the natives of India. Now every Englishman who has learned either Mahraṭhi, Guzerathi, Hindí or Bengali from a native teacher will have observed, that the Çâstrî or Munshî constantly corrects his pronunciation not of the *linguals* but of the *dentals*, and tells him that he (the pupil) always uses the former instead of the latter. The conclusion to be drawn from this fact is that the Englishman is familiar with the first class of sounds only. Besides, the natives of India in transliterating English words constantly use their linguals to express the English so-called dentals. They write for instance डीरेक्टर ḍîrektar instead of director, गवर्नमेंट gavarnmeṇṭ instead of government, etc. *(a)*. There is, I think, no doubt, that no English 't' or 'd' is strictly dental, though as far as my perception goes, the English 't' and d' sound much more lingual if followed by 'r' than if they stand alone. The 'r' exercises therefore in English the same influence as in Sanskrit, (see above). But it is not the Eng-

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(*a*) Note by the Editor.—Some time ago I made a similar remark as to the evidence afforded by transliteration of English words into Tamil. Thus 'Assistant Magistrate' is written அசிஸ்டாண்டு மாஜஸ்திரேட் asisṭánṭu májasṭiréṭ: 'Indorse' இண்டார்ஸ் indárs: 'endorsement' எண்டார்சுமெண்டு enḍársumenṭu : 'head' ஏட் eḍ : 'collector' கலெக்டர் 'kalekṭar' : 'certificate' சர்டிப்பைக்ட் sarṭippaikaṭ : 'court' கோர்ட்டு kórṭṭu : 'judge' ஜட்ஜ் jaḍj : 'judicial' ஜுடிசால் juḍisál : 'decree' டிக்கிரி ḍikkiri : 'deposition' டிபோசிஷன் ḍipósishan : 'district' டிஸ்டிரிக்ட்டு ḍisṭirikṭṭu : 'trustee' திரஸ்டி tirasṭi : 'notice, நோட்டிஸ் nóṭṭis : 'bond' பாண்டு báṇḍu : 'warrant' வாரண்டு váranṭu : 'Private Secretary' பிறைவேட் செக்ரிடேரி piraivéṭ sekriṭéri : 'Government' கவுறன்மெண்டு, Gavurnmenṭu. So in Telugu 'Magistrate' మేజస్ట్రేటు mêjastrêṭu : 'collector' కల్కటరు kalkaṭaru : 'doctor' డాక్టార్ ḍákṭár : 'acting' ఆక్టింగ్ ákṭing : 'August' ఆగష్టు ágashṭu : 'report' రిపోర్టు repórṭu : 'division' డివీజన్ ḍivíjan : 'October' అక్టోబరు Akṭóbaru : 'Assistant' అసిస్టాంటు asisṭánṭu : 'Head of police' హెడ్డాపోలీసు heḍdápólísu : 'certificate' సరిటిఫికేటు sariṭiphiketu.

lish alone which has lost the true dentals : the same remark applies to many of the so-called Low-German, or more correctly Saxon, dialects of the north of Germany, its nearest relations. It might therefore be conjectured, that the change of the dentals had already begun before the Saxon emigration to England took place. However this may have been, it is certain that the English language at present possesses linguals, and has developed them either by itself or conjointly with its continental kindred.

The purely High-German dialect as spoken in the middle and south of Germany likewise possess a limited number of lingual sounds. These appear instead of the corresponding dentals after 'sch,' as in 'schtehen,' the true High-German form for the 'stehen' of the written language and the so-called classical pronunciation of the North. The sound of this 't' is however not quite so hollow as that of the Indian 'ṭ,' no doubt because the German 'sch' is not pronounced so far back in the mouth as the Indian lingual 'sh.' I should rather say that it stands in the middle between the two. I am little acquainted with the pronunciation of the other Teutonic dialects and therefore unable to say if they show signs of the same lingualising tendency. According to a statement of Mr. Norris, repeated by Dr. Caldwell in in his Comp. Grammar p. 113, the Icelanders possess a lingual 'd' in words as fullr, falla which are pronounced like 'fudlr' 'fadla.' Dr. Kuhn in the Zeitschrift für vergleichende sprachforschung, vol. XIII, p. 80 shows that these and similar words are pronounced in a like manner also in Norwegian dialects. But I am not sure whether the statement that this 'd' is lingual can be accepted without further investigation. Mr. Norris, if I understand his words rightly, thinks that the group 'dl,' must be lingual, which is not a priori *necessary*. If he be right, the fact should be explained not as he thinks, by the influence of the Lappish language, but be quoted as another instance of spontaneous development of linguals. To prove the former assertion it would be necessary to show, that the ancient Scandinavian tongue has otherwise been influenced by the Lappish. The change of 'l' to 'd' finds its analogy in the modern Sardinian, where 'pellis' becomes pedde, pollex poddhige*(a)*.

Besides the Teutonic languages the Sclavonic family possesses unmistakeable linguals. But here it is the 'l' which has undergone this change. The l in Russian and Lianian—these are the only Sclavonic dialects which I have heard spoken by and which I have learnt from natives—sounds very frequently just like the Maraṭhi ḷ *(b)*, and this latter sound is undoubtedly lingual. In Russian this lingual) 'l' has the effect of making an immediately preceding 'd' also lingual, e. g. in dlŭgu.

GEORG BÜHLER.

February 1864.

(a) So buddiri (bollire), castẹddu (castello). The *dd* here sounds, according to Diez *(Gram. der Roman. Sprachen* i. 323), like English th. So in Sicilian cavaddu, addevu, beddu, griddu for cavallo, allievo, bello, grillo.—*Ed.*

(*b*) I have not adverted before to the existence of the Vedic ḷ simply because it is nothing but a substitute for ḍ, and ḷh for dh if these letters stand between two vowels. The Mahraṭhi ḷ seems not to owe its origin to the same laws.

MISCELLANEA.

I. *Six South-Indian Airs.*

THE Society is indebted to E. R. H., an accomplished lady, for five of the South-Indian airs now, it is believed, for the first time published. She took them down from the singing of her aya, a Tamil woman, named Annammá, and J. T. Mayne, Esq., Organist of St. George's Cathedral, has been good enough to arrange them so as to preserve their original simplicity. Of the nine airs collected by E. R. H. No. 1 is stated to be 'A hymn sung by the Muhamadans when Allah manifests himself to the people:' No. 2, 'An Indian song:' No. 3, 'A hymn in honour of Ráma:' No. 4, 'A war cry of the Mahrattas when fighting against the English:' No. 5, 'Chingárá Banglá, song composed in praise of Murugappa Mudaliyár's Bungalow:' No. 6, 'A mother's Lamentation on the death of her daughter:' No. 8, 'Dhobí's song:' No. 9, 'A lamentation supposed to be sung by a dove on her young being stolen from the nest.'

The cradle song No. 6, has already been printed with words by Monckton Milnes '(Lord Houghton)' entitled The Infant's Three Sabbaths, and an accompaniment by the Rev. J. Griffiths, M. A., which the Editor has taken the liberty to reprint here.

The Tamil words to this song, in the Tamil character, are as follows :—

சாஞ்ஜி பேபி, சாஞ்ஜி,
அன்னப்புராவே சாஞ்ஜி,
மாடப்புராவே, சாஞ்ஜி,
மயிலே, குயிலே, சாஞ்ஜி,
ஆவாரம் பூவே, சாஞ்ஜி,
குத்துவிளக்கே, சாஞ்ஜி,
கோவில்புராவே, சாஞ்ஜி,
அன்னக்கிளியே, சாஞ்ஜி,

Which is, being interpreted,

"Swing, Baby, swing!
Swan-dove, swing!
House-pigeon, swing!
Peacock, cuckoo, swing!
Cassia-flower, swing!
Standing-lamp, swing!
Temple-dove, swing!
Swan, parrot, swing!"

The accessible sources of knowledge of Indian music are still only two—Sir Wm. Jones' Essay *On the Musical Notes of the Hindús*, published in the third volume of the *Asiatic Researches*, p. 55, and J. D. Patterson, *On the Grâmal or musical scales of the Hindús*, Ibid. IX, 445. The following neat statement of the chief points established in these essays is translated from the fourth volume of Lassen's *Indische Alterthumskunde*, ss. 832, 833: "The native musical literature is tolerably copious, and the Indians are acquainted with four systems, whose founders, as usual with them, are mythical personages. The first system is ascribed to Devarshi Nárada, who in the epic poetry appears as well-skilled in stories, and goes about between the Gods and men, to recite tales to them. From him I'çvara or Çiva received this system. The author of the second system is Bharata, the mythic inventor of the dramatic art: the author of the third, is the divine ape Hánumat, and that of the fourth, Kapila, the founder of the Sánkhya-philosophy. These assertions of course only mean that the Indians attached a high value to the practice of music; and this view is confirmed by the circumstance that in the epic mythology the Gandharvas appear as musicians in Indra's heaven. For the antiquity of song amongst the Indians, it is important to observe that the Udgátar i. e. the priest who sings the *sâman*, belongs to the Vedic period. As to later times we may refer to the fact that in the Mṛicchakaṭika Rebhila is praised as a renowned singer.

"The Indians are acquainted with our scale of seven tones, and denote them by letters [*sa, ri, ga, ma, pa, dha, ni*]. They admit, moreover, six rágas or modes, and the musical treatises contain minute directions as to the employment of them in the six seasons into which the year is divided. The Indians have also mythologised these ideas, and regard the six rágas as godlike beings, whose consorts are called Ráginîs and are eight in number. These couples produce forty-eight sons called *râgaputras*, by whom the various mixtures of the chief modes are denoted. This view furnishes a very striking example of the boundlessness of Indian imagination, as it is impossible really to distinguish so many modes from one another. In some MSS. are found portraits of these two and sixty male and female genii. A more accurate investigation of the musical writings of the Indians would be highly desirable, as they throw much light on the representation of the dramas"*(a).*

II.—*On the Early Marriages of the Hindús.*

AT a monthly meeting of the Bombay Branch of the Royal Asiatic Society, held in its library rooms on Thursday the 9th June 1863, Dr. Bühler read a paper on the early marriages of the Hindús, in which he attempted to prove that the laws enjoining the early marriages of girls are opposed to the practice of the Vedic age and therefore not binding, even for an orthodox Hindú. He first traced the gradual development of these laws in the Smṛitiçâstras. He pointed out that one class of these works to which the Sâmvarta, Âṅgirasa, Parâçara and other dharmaçâstras belong, limit the time for marriage much more, and are much severer in threatening punishments for offenders against their laws than Manu, Gautama and Baudhâyana. For whilst, according to the former, girls must be married before ten, or lose their caste, the latter authors, though they recommend early marriages, allow the father to keep his daughter at home up to the age of thirteen. After that time daughters are allowed to choose their husbands for themselves. The *a priori* supposition that these laxer rules are the more ancient, receives full confirmation from the Smârta, especially the Gṛihyasûtras from some of which it appears that marriages with women as well under as of more than full age were permitted by law.

But whilst the Smârta Çâstras and Sûtras permit the contraction of marriages with females under age, the Ṛigveda seems to be opposed to this custom. Amongst the Ṛiks which are recited at the marriage-ceremony, there are some (R. V. X. 85, 38-41) which express the belief that the bride belongs to the three gods, Soma (the moon), Gandharva and Agni, before she passes into the possession of mortal

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(*a*) The library of the Madras Board of Examiners contains seven copies of the *Bharataçástra,* a standard work on music, dancing and theatrical exhibitions. No. 2041, Taylor's Catalogue, I, 153), No. 1291 (Ibid. i, 291), No. 996 (Ibid. i, 433), No. 1587 (Ibid. i, 434), No. 757 (Ibid. ii, 211), No. 528 and 611 (Ibid. ii, 387), No. 284 (2) (Ibid. ii, 773). There is also a No. 1666 at vol. 1, p. 434 which is said to be "prefaced by matter on musical modes, and on the tunes adapted to times and occasions. A Telugu collection of tunes, called *Sangîta Ratnákaram,* was printed at Madras by Véṇugo'pál Náyakkar in 1862. And the Editor possesses a similar MS. in Canarese entitled *Sangîta Ratnamála.—Ed.*

man. The bridegroom prays to Agni and Gandharva to cede the bride to him, and afterwards declares that Agni has given up his right of possession. These singular expressions are explained by Gobhilaputra, the author of the Grihyasaṃgraha, Samvarta, and Atri as allegorical. The girl is said to fall into the power of Soma when inguen pube contegitur, into the power of Gandharva when mammae ejus intumescunt, and into that of Agni when she has her καταμήνια τὸ πρῶτον.

This explanation, which is confirmed by modern researches on Vedic mythology, proves beyond doubt that, at least when these mantras were composed and introduced into the Bráhmaṇic liturgy, every bride must have attained puberty. Hence it is evident that in the Vedic age, and perhaps even later, the custom of early marriages was unknown(*a*). Dr. Bühler concluded his paper by pointing out that according to the best authorities on Smârta subjects, a law given by Smârta writers which is contrary to the words of the Veda Çruti, is not absolutely binding, and that either the Smṛti or Çruti rule may be followed.

III.—*The unprimitiveness of the Hindú veneration of Cows.*

WE take the following passages from the second volume M. Pictet's *Origines Indo-Européennes.* Paris 1863, pp. 45, 46, 62. In Sanskrit the guest is called *goghna* 'he who kills the ox or cow,' or according to Páṇini, 'he for whom they kill a cow *(yasmai gáṃ ghnanti,* Böhtlingk—Roth. II. 794) which answers to the biblical expression 'to kill the fatted calf.' It is doubtless to this usage that allusion is made in a passage of the Rigveda (I. 31. 15) Svâdukshadmâ yô vasatau syonakṛjjîvayâjram yajate sopamâ divaḥ, i.e., according to Rosen, Dulci cibo instructus, qui domi (hospitibus) oblectamenta parans, vivam hostiam mactat, is est similis coelo. It is evident that this custom could only have prevailed in India in the most remote periods, and that the cow

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(*a*) This note (the greater part of which is taken from the *Bombay Saturday Review*) only shows that the marriage of *girls* before puberty has not the sanction of antiquity. As to the male sex consider the following passage from H. H. Wilson's *Essays* II, 58, 59. "The Vedas then did not sanction the marriage of children. In fact, it was impossible for a man to marry before maturity, as nine years are specified as the shortest term of his studentship, until the expiration of which he was not allowed to marry. He did not enter his studentship till he was seven or eight, and therefore at the earliest, he could not have been married before seventeen; an early age enough, in our estimation, but absolute manhood, as compared with the age of nine or ten, at which Hindú boys are, according to the present practice, husbands."—*Ed.*

was not then surrounded with an almost religious respect, as in the laws of Manu (xi, 59. 108) and the epics................ According to the tradition, the sacrifice of the cow *(go-medha* or *goyajna)* forbidden since the beginning of the Kaliyuga, the present era, had previously been in use.

IV.—*Bhútáḷa Páṇḍiya.*

Bhútáḷa Páṇḍyana, Aḷiya Santánada Kaṭṭukaṭṭale. Mangaḷúr German Mission Press 1859. Translated by M. O. SINGALA'CHA'RYA, Canarese Translator to the High Court of Madras, Appellate Side.

ON Friday the third Mágha Çuddha in the first year of the era of Çáliváhana, corresponding to the cycle year I'çvara, at Siṃhalagnam, when the moon had arrived at her twenty-sixth mansion called Uttarabhádrapada, Bhútáḷa Páṇḍiya, nephew of Devapáṇḍya, having been seated on the throne given by Devendra to Vikramáditya was installed at Vizayanagar as follows. Devapáṇḍya, a merchant of the Páṇḍya country, having caused new ships to be built and filled them with cargo worth millions of pagodas, was about to launch them into the sea, when a Çivagaṇa (an attendant of Çiva) called Kuṇḍodara, seeing the ships to be new ones, demanded a human sacrifice. On this, Devapáṇḍya went to his house, and consulted his wife as to which of (his) seven sons should be given in sacrifice. In the meantime, his wife took the said seven sons along with her and repaired to her parents' village. Then the said merchant Devapáṇḍya laid himself down in his house under deep sorrow and abstained from food and drink. In the meantime, his younger sister Satyavatí hearing the news, came down and spoke to her elder brother, and being informed of the circumstances, pacified him by saying "you should not care for this trifling matter. Do you give the boy Jayapáṇḍya, a son of mine, as a human sacrifice; now get up and take your meals, etc." She then gave her son Jayapáṇḍya and went to her husband's house. The said Jayapáṇḍya was the son of Vírapáṇḍya, king of that dominion, who was defeated by Chandrángadaráya; consequently at the time of the offer of the sacrifice, the said Kuṇḍodara who was the king of the demons, perceiving him (the boy Vírapáṇḍya) to be a mahápurusha (an eminent or miraculous person) refused to accept the sacrifice on account of the ships of Devapáṇḍya and being graciously pleased with the boy Jayapáṇḍya exclaimed thus.

"By reason of my having been pleased with you, you should take my name and become master of the world, and be called by the name Bhútáḷa Páṇḍya: I have by the order of Çiva given you all the dominions that were ruled by Chandrángada who had defeated you." Instantly the said Bhútarája (king of demons) entered the town of Ujjayiní and having subdued the eight demigods such as Bhairava, &c. gave Bhútáḷa Páṇḍya a pratinidhi Siṃhásanam*(a)* throne which had been given there by Devendra to the said Vikramárka, and entered the town of Jayantika accompanied by Bhútáḷa Páṇḍyaráya.

While one Siddhavíraprasiddharáya was ruling there on a royal throne, the said Kuṇḍodara destroyed him by using various annoyance towards him. As this Siddhavíraprasiddharáya left no issue, the whole subjects of the state and retinues thereof met together; and a flower garland having been placed on the trunk of an elephant, a procession was carried on, when the said elephant put the flower-garland on the neck of the said boy Jayapáṇḍya, and, having made him sit on the throne given by Devendra, placed him with the throne amongst the assembly of the palace at the above mentioned Lagnam (propitious time) and prostrated himself. Then the whole subjects and retinues performed the paṭṭabhisheka ceremony for the prince and crowned him king. They also caused rewards in cloths and other gifts to be made and having caused complimentary presents to be made on account of the coronation returned to their respective houses.

Thereupon the said king reigned for six years, during the lapse of which the Makkaḷa Santána (rule of inheritance in the line of sons) was set aside, and that of Aḷiyasantána (inheritance in the line of nephews) was substituted for the following reasons. On the sixth year Chitrabhánu the ships of Devapáṇḍya sailed towards an island which was covered with snow and darkness, and there stuck to a miry bank. Then the provisions and water stored in those ships having been expended, Náráyaṇapáṇḍya, the Captain of the said ships belonging to Devapáṇḍya, as well as the other seamen, were grieving for the same, when the said Kuṇḍodara having become visible said, "O Náráyaṇa Páṇḍya, hear thou, do not thou fear; there is a mountain to the west of this where there are hasuruçilegalu

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(*a*) Throne similar (to that of Devendra.)

(green stones) and siddharasam*(a)* (liquids made formerly by Siddhas.) Have the siddharasam poured into caldrons, &c., and also get the hasuruçilegalu (green stones) laden and pray to me at the same time: then the said three ships will float themselves." The said Kuṇḍódara after having said this, disappeared. Then Bidudoni boats were let down; and on the green stone and Siddharasam being caused to be laden therein, prayers were offered to Kuṇḍódara, when, a heavy whirling gale having come on, the ships sailed away and rushing in the river-mouth of Hangarakatte harboured at Kallyanapur. Then the merchants of that place, having heard of and seen the Hasuruçiḷe and Siddharasam therein, gave notice of the same to Bhútaḷapáṇḍiya, who went thither and on an enquiry and inspection thereof a second time, found the said ships to be those of his maternal uncle Devapáṇḍya. Consequently he sent at that time to Páṇḍya country and having sent for his maternal uncle Devapáṇḍya said to him, "Do you take these goods laden on your ship." In the mean time, the said Kuṇḍódara said that he would not let the ships sail unless some one of his sons were given as a sacrifice. Whereupon he called his wife and children; and showing to her the goods aforesaid, took counsel as to giving any of those children as a sacrifice, when she declared in the presence of ten thousands of people of the great world that gathered there, that she did not want the goods, and so went down. Then, the said ten thousand people of the great world, the king, subjects, attendants, &c. learning the story of the said Bhútáḷa Páṇḍyaráya from the origin, resolved that Bhútáḷa Páṇḍyaráya was entitled to the said Siddharasa liquid and Siddhasile stone.

Having himself had a title to the said Siddharasa and Siddhasile under the said resolution, he took them and, having made a well in front of the deity Someçvara, secured them therein. He then gave the said Someçvara the name Siddheçvara. Then, a building having been consecrated to the said Kuṇḍódara with such other things as are in honour to the same, an image was set up to represent him, to which the name Mahishásura, the protector of the world, was also given. Thereupon, a thousand paḍis of rice, and as many paḍis of flour made of fried paddy, and of

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(*a*) These are supposed to effect the transmutation of gold.

Avalakki(*a*), a thousand cocoanuts, tender cocoanuts, and plantains, as also a thousand paṭṭís(*b*) of betel leaves and a thousand fowls and sheep were given in sacrifice to the said Mahishásura with consecration of incense on fire, and of light, &c. Then all the people and the attendants offered prayers to the said Mahishásura giant, when, the said Kuṇḍodara, having inspired a person, assured (them) that uniformity of system and law should be followed by the rulers and the subjects; and on their declaring that they all would act up to the same unanimously, Bhútáḷa Páṇḍya caused fourteen Kattalekaṭṭu and sixteen Kaṭṭale rules to be written in the Madhya Manṭapa of Narasiṃhadevaru deity of the world, whereby the system of Aḷiya Santána or Nepotism has to prevail thenceforward among the ruling authorities and the subjects, and consecrated the same in the Madhya Manṭapa of Ananteçvara Devaru deity of the world. He also declared a curse that the family of such person as shall deviate from these rules, shall become extinct. He also pronounced that Balisávira Brahma and the said Mahishásura are the Adhidevatás for the said Kaṭṭu rule, that the said Narasimha and Ananteçvara are Kuladevatas (family deities), and that Brahma, and Kshetrapála in the Pagoda of Ananteçvara, as also the goddess Rakteçvarí on the right side of the Narasiṃha Devaru deity of the world and Kuṇḍodara Mahishásura, are Sthánadevatas (local deities) for the eighteen classes of people following the Aḷiyasantána system in each direction.

Thus Bhúṭáḷapáṇḍya reigned for twelve years. During the said interval, Bhúṭáḷapáṇḍya had for the performance of his marriage sent for twelve virgins through Kesavaṇṇa and Basavaṇṇa of the Jaina caste, whom he called from over the Gháṭs by sending message to that effect, and having married those virgins called the town Jayantika aforesaid by the name "Barakanyapur" (meaning city of twelve virgins) because twelve virgins were married in that town. On account of these twelve paṭṭáráṇís twelve Bastís (Jaina temples, *vasatí*), as many numbers of Çivalaya, Vishṇuvalaya, Durgalaya pagodas, as also places for twelve Gaṇapatis, Naga, Brahma, Kshetrapála, Rakteçvarí, and Mahishantáya, were built. Then four lakhs of houses (*guḍiṃane*) having also been erected, a Nagareçvara (deity

(*a*) Paddy soaked partly dried, roasted and pounded.

(*b*) A number of betel leaves folded up and having nuts wrapped up in one of them.

of the town) was also seated in the four corners obtained the following exclusive title:—

The king of kings, master of the throne of the king of kings, master over the masters of four countries called Tuḷu, Malayáḷa, Haiga and Karṇáṭaka, the first personage in the era of Çáliváhana ಚಾಷಷ್ಟಿ ಪ್ರಧಾನಯೋಗಯೋಗೇಶ್ವರ master of the sixty-four principal sciences (chatushshashṭı-pradhánayogayogeçvara), son of Vírapáṇḍya and child of Satyavatí, the true king of the people, sovran of the world, master of heroes, courageous and valiant, among heroes a spring-hero (shining like springtime) and king of Bárakanyápura (the great town of twelve virgins.)

Then he received the sixteen kinds of honours known in the world, and continued reverencing the Mahájanam (or people eminent for wisdom): he also remained pious towards the priests and gods; and having punished the wicked and protected the virtuous, allowed the customs of each caste to be observed. In the meantime he got an equal number of sons and daughters, by each of the said twelve royal wives. He divided his territory into portions on account of his twelve children; and the particulars of the princes to whom he made grants are as follows:—two Saṃsthánams (states) called Chauṭa and Bangaru, two Arastanams (kingdoms) called Múlaru and Tuḷuvaru, two Dhoretanams (governments) called Ajalá and Śávantá, two Diváns called Bhairasa and Bhárasa, two vaḍḍús (seats or ranks of authority) called Kunda and Bunnáḷa, two chávaḍís called Neranki and Kadaríça. Of these twelve princes the Chauṭa and Bangaru are the principal ones. The said heads of the two parties of (Múlaru and) Tuḷuváru have been called vice-lords, and these have (also) been pakshaprabhus (chiefs of the parties) for the thirty-two principalities which were formed by the said Kesavaṇṇa and Basavaṇṇa and for the seven tribes that followed the Makkaḷa Santána system, and also for the (newly established) eighteen castes that have to follow the Aḷiyasantána system. Bhúṭálapáṇḍya appointed the said chiefs, who are Tuḷuva kings, to regulate the observance of the caste of these Baḷḷáḷás.

Bhúṭáḷapáṇḍya thus ruled 75 years, and then appointed his nephew Vidyudyumnapáṇḍyaráya to rule over the country, which he did for eighty-one years. During the lapse of those years, he begot sons by twelve queens, and the particulars of these petty princes to whom he made grants are as follows. Two Aḍés, called Maradaḍe and Márambaḍe; Kaṭṭapádí and Kúlúr Dhoreballálás two; Paḍubidre and Iravattúr Kinnari Ballálás, two; Muḍuru, and Muddála Kinnari Arasus two; Yelanáḍu and Ainádu Heggaḍes two; Mudráḍi and Kántávara Kinnari Heggaḍes two. These are the twelve petty princes. The history of what happened on the sixth year of the coronation (of the said king) is as follows:—Kuṇḍódara (told) Vidyudyumnapáṇḍyaráya in an aerial voice that as the Kali (yug) approached, the green stone (emerald) and the treasure of precious stones should be buried under ground; that the well of Siddharasa should be shut up, and the image of Nága set up (thereon.) Having done this he received tributes from these Chauṭa and Banga and other kings and ruled for 81 years. After his death the following kings, who descended for seven generations from him, reigned respectively, viz., Bhúṭálapáṇḍyaráya for 75 years, Vidyudyumnapáṇḍyaráya for 81 years, Vírapáṇḍyaráya 32 years, Chitravíryapáṇḍyaráya 16 years, Devavírapáṇḍyaráya 9 years, Balavíryapáṇḍya 19 years, Jayavíryapáṇḍyaráya 27 years. These seven kings reigned in all 259 years.

Particulars of rules.

The fourteen rules enacted for three classes of people other than the Bráhmans are the following, viz:—

Játi, Níti, Mána, Maryáde, Huṭṭu, Kaṭṭu, Hinde, Munde, Hechchu, Kammi, Baḷi, Baṇṇa, Aḷi and *Uḷi*. The particulars of the above are thus:

Játi and *Níti* are the customs and manners observable by each caste. *Mána* and *Maryáde* are the marks of honour to be used by each (caste). *Huṭṭu* and *Kaṭṭu* are the abolition of the Makkaḷasantána system in all castes and the introduction in its stead of the system of Aḷiyasantána. *Hinde* and *Munde* (behind, before) are the different degrees of superiorities consisting in the Paṭṭa (fillet) and Paṭṭavali honours, held by four, eight and sixteen (houses respectively.) *Hechchu* and *Kammi*, 'superiority' and 'inferiority' are the distinction of respects which each caste deserves. *Baḷi* and *Baṇṇa* are such a class of people as have no seats and marks of honours. *Aḷi* and *Uḷi* are the death and succession by heir to the property.

Particulars of *Játi* and *Níti*. *Játi* or the classes of people are, Tuḷuvaru, Malavaru, Náyammáraru, Másádika, Jainaru, Hariçeṭṭi, Pariyaru, Kumbáraru (potters), Devaḍiga, Sáliya (weavers), Malekuḍiya, Pánchála, Kshauraka (barbers), Ágasa (washermen) Haḷepaika, Muṇḍáḷas, Kariññára, Holeya, Anḍékoraga, &c; and Nítí or rules enacted by Bhúṭáḷapáṇḍya for these classes, are that each of these should behave itself with such distinction as is to be observed in respect of its superiority or inferiority and also in such a manner as the manners and customs peculiar to each class may direct. The Mána Maryáde is as follows:—[Here occur eight lines unintelligible to me.—M. O. S.]

Huṭṭu Kaṭṭu is as follows:—

Bhúṭáḷapaṇḍya, having put a stop to the Makkaḷa Santána system, recorded rules in the Madhya Maṇṭapa of Ananteçvara deity of the world to the effect that the rules of Aḷiyasantána should be observed, and that whosoever shall deviate from the same, his family shall become issueless: thus the said Bhúṭáḷapáṇḍya repealed the Huṭṭu (succession in the male line), which was established before, and introduced the Aliyasantána system in its stead. Huṭṭu is this. Bhúṭáḷapáṇḍya promulgated the rules to the effect that only the wife and children should observe the imaginary pollution on the occasion of death, and share in the sin or virtue as also in the virtue accruing from gift and charity, and the fame or infamy (arising from any deeds), while the Santána (heir) is to observe the pollution only on the occasion of birth and not on that of death, and to succeed to the property.

Kaṭṭale is as follows:—

Bhúṭáḷapáṇḍya made it as a rule that no auspicious ceremony is to be celebrated through Brahmans, nor Mahályam (some inauspicious ceremony) to be performed for the deceased persons; nor the Panchagavyam is to be taken; nor the Puṇya Hóma ceremony attended with the use of Darbha (holy grass) on the occasion of birth and death to be performed; whereas on the occasion of death or birth only the Nirmálya (remains of the offerings) left in the pagoda (is to be taken) and in the name of those that brought forth children or died, the Púja as well as the Abhishekam ceremonies are to be performed for the deity besides the celebration of Çánti and Samarádhanam ones.

Hechchukaṭṭaḷe or customs and manners to be observed on a special occasion.

Bhúṭáḷapanḍya made a rule to the following effect:—

When a girl arrives at puberty, there should be the following honours on such auspicious occasion; namely, a Nerrinamaṇṭapa (or a perpendicular wooden frame) with cloths covering the four pillars thereof and a canopy attached thereto; *Naḍemaḍi,* (cloths spread on the road for the procession to pass over); *Naḍechappara,* (canopy used in procession); *Naḍevádya* (musical instruments played in such procession) the dancing (of girls) and music, &c.: while on the occasion of death, *Nele Upparige* (a litter with upper story); music with *Pari,* as also the drums called *Bhéri* and *Dólu,* and the bell should be made use of and rice scattered about with the cry of *Muriyo, Muriyo.*

Baḷi (classes) are eighteen and *Baṇṇanirubaḷi* (or such classes as have the colour of a caste,) are four. The family of such person as has established Baḷisavira Brahma in the territories ruled by the king, who is competent for a Baḷi (class), is pure. Bhúṭálapáṇḍya declared that the Baḷi of such person as is not fit (for the same) or of such person as has no Brahma, or also of such an one as has no king for the country in which (he lives himself) is *Baṇṇa Kammi* 'inferior'.

Sávu and Bálu are as follows. The eldest, either female or male, of the children of (one's) senior and junior maternal aunts, (*hirikiritáyi*) may stand (as a manager) on the death (of the former incumbent); but the children of (such) senior and junior branches would not be entitled to a partition. The (other) members of the family should live unitedly. If in so doing, discord arise between the elder and younger sisters, the eldest of these should give the younger a house as well as an allowance for the household expense, and should manage the affairs, having herself had a title to *Uriçiri* (good or bad?) Bhúṭálapáṇḍya made a rule that no niçuddhi (partition) should be made(*a*). Only the surviving heir will be entitled to the seats of the Paṭṭam, and Paṭṭi honours, and not the other members of the family, who would only be entitled thereto on the extinction of such heir.

Badukugalu are thus:—

Bhúṭálapáṇḍya recorded the rule that, excepting the wedding-gift given to a married girl, the property that may be given (to her) by the husband of his own accord, though it be only a *vísam* (a trifling portion, a sixteenth), may

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(*a*) In S. A. No. 83 of 1862 the High Court of Madras held that division of family property could not be enforced by a member of a family governed by the law of aliyasantána, 1 Mad. H. C. Rep. 380; and this decision was followed in S. A. No. 323 of 1863.—*Ed.*

be taken away by the members of the family. He may assign to his children in gift, land, house, gold, silver, cow, calf, bullock, seeds &c., of his own acquisition, but not any ancestral property—the children would (thus) possess a right to the father's property.

Having made rules for each caste, he declared as follows. Should, on failure of heirs (in a family) a girl of the same Baḷi (class) be fostered, it will amount to an adoption of a girl, and there shall be no adoption of a male*(a)*, Moreover, on the plea that there is no heir in the family in which succession by heir has to prevail (as aforesaid,) no (rights) should be sold, nor should anything be conferred on the wife and children. If the line of the family is extinct without adoption, the (heads of the country) consisting of four, eight or sixteen persons shall cause a girl and boy of another family of the same Baḷi to stand as representatives of such extinct family, and these (representatives) alone will then succeed as heirs, but not the wife and children.

The merchants of the suburbs and town as well as every one, such as a servant, retainer &c., saying that they were the followers of (the rules of) Aḷiyasantána, and that there existed rules contrary to the Çástras observed by the Mahájana people of the said thirty-two villages, intended to usurp the *(Siddharasam)* liquid and the green precious stones which were received (formerly) in three ships. The course taken in order to prevent such usurpation was as follows. When Pújá was performed and offerings consecrated to the said Kúṇḍódara on account of the ships, the Brahmanámams (Bráhmaṇs) offered opposition. Then the chiefs of both the parties came together, and with a view to avoid disagreement among the Mahájana people, allotted the territories of Nandarája to Púrvapakshanátha (the chief of the eastern division) and the sovereignty of one Niḍamba to Paçchima Shóḍaçapakshanátha (the chief of the western division consisting of sixteen (villages); and having called the former Balagai (బలగై, right hand) Baḷḷáḷás and the latter Eḍagai (left hand, ఎడగై) crowned the chiefs of both the divisions with the title of Ubhayabaḷḷáḷás (two Baḷḷáḷás). Bhúṭáḷapáṇḍya ruled that these two Baḷḷáḷás were competent for the eighteen classes; that if the death of (any one of) them takes place, the rules of Aḷiyasantána alone should be observed (on that occasion), though

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(*a*) So held by the High Court of Madras in S. A. No. 162 of 1863, Oct. 24, 1863, present Phillips and Frere JJ.—*Ed.*

their family may have been the followers of Makkalasantána system. He further observed that should any of the Ballálás of the above paṭṭam (seats of honour) die, a corpse should be made in his stead in *Baikuṇṭe* (straw) and the people of the eighteen classes joining together, should burn this corpse; that there must be a Púmáḍa Kaimáḍa Neleupparige (a litter with stories, adorned with flowers, &c.,) and *Chaturánga,* (four kinds of troops), *Tóraṇa* (string of leaves, flowers or sometimes cloths with ornamental needle-work hung across the highway), all sorts of musical instruments played upon, and drums beaten; and with all these they should scatter rice about—failing which they the eighteen classes of people will be in pollution, and that because it (the Baḷḷáḷá) is a spiritual preceptor and the people of the said classes are disciples (they) should observe the pollution as aforesaid.

Sixteen kaṭṭaḷes or rules.

1. It being asked that as there is only one girl (heir) in each family governed by the Aḷiyasantána rule, how would the line of the family continue for the future if the death of the husband of such girl should take place, Bhútáḷapáṇḍya declared that (in such case) the parents are not competent to give such girl to another person in marriage; but the maternal uncle and other members of the family may do so; that the parents are only to touch the Dháre Giṇḍi (a metal vessel with a tube on its side by pouring water from which a girl is given in marriage) while giving their daughter in marriage, and it should not be the custom with them to get (the girl married) by pouring water as aforesaid.

2. If in that (in the Aḷiyasantána family) a girl loses her husband, such girl is called a Buḍavaḷati. If the girl happens before she is wedded (a second time) to be pregnant by intercourse with another person of her own caste, Bhúṭáḷapáṇḍya declared that she may be given to such person in Buḍadháre marriage on receiving a fine from him. Bhúṭáḷapáṇḍya added that if the person is of a higher caste than the girl, she may be allowed to be kept by him, or, on the contrary, if he be of an inferior caste, the Baḷḷáḷás may sell such girl on exacting a fine from him.

3. If a husband goes to another country leaving the married girl alone, Bhúṭáḷapáṇḍya declared that she may after the expiration of five years (from such absence) be joined and

wedded to another person. He also said that if she be found to be pregnant in the absence of her husband, she may be placed in the keeping of her paramour provided he be of superior caste, or wedded to him, provided he be of the same caste (with her), or if he is of an inferior caste, she may be abandoned, fined and joined to such caste.

4. If, after such girl have brought forth three or four children subsequently to her marriage, the husband goes to another country, she cannot be wedded to another person. If she had had connection with a person of equal caste and proved to be pregnant before the return of her husband, she cannot be wedded. If in such case, the person be of an inferior caste she should be abandoned (excommunicated.)

5. Bhúṭáḷapáṇḍya recorded a rule to the following effect. If a married girl find her husband to be an adulterer, and if the latter find the former to be an adulteress, and so if the husband take her and deliver her over to her parents' house, she may be wedded to another person. If the husband will not have her again and take care of her on receiving another woman into his keeping, the members of her family may send for her from her husband and wed her to another person. Moreover, if (the husband) tease the wife by striking and abusing her as he likes, a reconciliation may be effected between them three or four times; but should there be a recurrence of disagreement among them even afterwards, the members of her family may send for her from her husband and get her wedded to another person.

6. If a girl shall arrive at puberty before marriage and become pregnant before marriage, such girl, as well as the person that caused such pregnancy, should be fined, and the girl may be given into the keeping of that person if he be of superior caste, or married to him if he be of the same caste; or abandoned if he be of an inferior caste; as declared by Bhútáḷapáṇḍya.

7. If a girl who arrived at puberty as aforesaid takes any body before her marriage and elopes with him, she may be married to him if he be of the same caste with her, or abandoned if he be of an inferior caste, or be allowed to be kept by him if he be of superior caste; as ruled by Bhútáḷapáṇḍya.

8. If a married girl leaves her husband and takes another of the same caste with her and elopes with him; she may

be wedded to the latter. If the person so taken by her be of superior caste, she may be left in his keeping; or abandoned at once if he be of inferior class, as declared by Bhútálapáṇḍya.

9. In respect of the girls of Kshatriyas, the manners and customs of Kshatriyas should be observed. Between Kshatriyas and Bráhmans, marriage may be performed by Kaidháre (giving the girl in marriage attended with the pouring of water through the giver's hand in continued dropping). If the male is of the same or of inferior caste (with the girl) she shall be abandoned; as mentioned by Bhúṭálapáṇḍya.

10. As regards the Jaina caste. If (the male is) of the same caste she may be left in his keeping, and if she had joined a superior or inferior caste, she must be abandoned, as declared by Bhúṭáḷapáṇḍya.

11. If the girl is of Malavár caste (and the male is) of the same or superior caste, she may be allowed to be kept by him; or if (he is) of an inferior caste, she should be abandoned, and it is not possible to call her again, as declared by Bhúṭáḷapáṇḍya.

12. Bhúṭáḷapáṇḍya declared that, among the two castes Náyammár and Náyar, there is only Kanyákalyáṇam marriage, but not Svayamvaram marriage; that afterwards (the girls) may be given into the keeping of the persons of the same caste or those of a superior one, such as Bráhmans, &c.

13. As regards the Kadamba caste and Kumara Baḷḷáḷa, the girl may be given into the keeping of a male of the same caste or of the Kshatriya, Bráhman, &c; but if (the male) is of an inferior caste, she should be abandoned, as declared by Bhúṭáḷapáṇḍya.

14. As regards Stháníkás and Ambalavásís. If (the male is) not of the same or Bráhman caste but is of another inferior caste, she will be abandoned, as declared by Bhúṭáḷapáṇḍya.

15. Bhúṭáḷapáṇḍya said that a girl of Padárthí and Horapoduvaḷu may be taken into the keeping of the person of the same caste or of a superior one after Uḍige cloth shall have been given to (her).

16. As for Arasus (kings), a Bráhman may cause the marriage ceremony to be performed. As an Anyata gift is

made to the children born of him *(Arasu),* Bhúṭáḷapáṇḍya declared that the marriage ceremony may be performed by (fixing) pillars and (placing) pots, &c. If those Arasus are such as are incompetent to make the Anyata gift, Bhúṭáḷapáṇḍya said that it would not be possible to get the marriage celebrated according to the customs observed by the Bráhmans. Bhúṭáḷapáṇḍya also declared that during the occasion of auspicious and inauspicious ceremonies, Chauṭas and Bangaras will have to pursue the manners and customs observed by Brahmans; and the Chiṭupáḍi and Niḍambúr Baḷḷáḷás the Aliyasantána system during such occasions; and that from the class of Tuḷuvas down to that of a Návika the nepotism rules should prevail uniformly. Thus Bhúṭáḷapáṇḍya made the nepotism rules.

In the twelfth year after the installation of Bhúṭáḷapáṇḍya, Kesavaṇṇa and Basavaṇṇa, who were the learned men among the Jainas, were sent for from over the Gháts and rewards and presents were given them; after which they built the following cities. Barkúr and other fifteen cities for Kesavaṇṇa, and Mangalúr and fifteen other cities for Basavaṇṇa. Chauṭas and Chiṭupáḍi Baḷḷáḷás are the chiefs of Barkúr town, while Bangas and Niḍambúr Baḷḷáḷás are the chiefs of Mangalore town. In these thirty-two cities, thirty-two Bastis (Jaina temples) were built, and the suburbs in which Jainas and other persons of superior class lived, have been called Péṭa. Paṭṇaseṭṭi is the person that remains therein. The heads consisting of four, eight or sixteen in number, are Péṭe Hallaru. Those that collect in a Chatussanga are *Peṭejanaru* (or the people of suburbs.) If the people of four castes namely Bráhma, Kshatriya, Vaiçya and Çúdra collect in one place it is called Chatussanga. Those that sell different articles in the said Péṭe, are called merchants, while those that sell and purchase gold and silver are called Chinivāradavaru (or dealers in gold, &c.) The people that farm the duty on articles exported and imported into the Péṭa and also weigh them before themselves are Toládháris, and those that store all articles and get them sold by giving the same to different shopkeepers are Sáhukárs, while those that bring nine sorts of precious stones as well as cloths, and also those that bring nine sorts of grains on bullocks and export them on them are Çeṭṭigárs. If all these persons collect in one place they are called Sávakárs.

If houses be caused to be built by artificers on both sides of the road of the Péṭa, the same takes the name of Kéri, and a collection of drapers' shops lying in a line goes by the name of Maḷige, while great houses full of articles worth many thousands of Pagodas are known as Bhanḍásále. The street of Pánchálas (carpenters, braziers, blacksmiths, goldsmiths and stone-cutters) where gold and silver jewels are wrought as well as brazen and copper vessels, as also carpentry and turners' work are made, is called Pánchálakéri, and the place where potters, *Devaḍigas,* musicians live, is included in Kumbárakéri (Potters' street.) The street Samagárakéri contain Samagárs, washermen, barbers, tailors, &c., and Viyápárakeri street is that which is inhabited by Mlechchas, traders, &c. Súḷagéri is the street where dancing girls, Máleyaru, harlots, prostitutes, &c., live; Nishiddhakéri is the street where liquor, meat, &c., are sold; and if there are in the vicinity of this street the Paraya houses in a line, it is a Holagéri street. That which has no Kéris but only a Péṭa (a collection of shops) is known as Péṭa itself. If there are Kéris (with Péṭas) it is a town. Where there are ramparts round the town, and a fort in the centre, and also ramparts of the fort in the districts, and also where there is a king's rule, such place is termed Bandar, and if there is a lakh of houses therein, it will be called a Nagar, which, if it contain more than four lakhs of houses, will be known by the name of Jayanti.

The above thirty-two Nagars are as follow :—

Barkúru, &c. 16 Nagars, which have four lakhs of houses and Mangalore, &c. 16 Nagars, which have three lakhs of houses. The said 16 former Nagars are, 1 Barkúr, 2 Kaḍama, 3 Múḍabidre, 4 Kárkáḷa, 5 Basarúr, 6 Bangáḍi, 7 Paḍubidre, 8 Yeṇúr, 9 Kápu, 10 Mudráḍi, 11 Surálu, 12 Nárávi, 13 Yeramáḷa, 14 Aḷavu, 15 Munḍkúr, and 16 Bailangaḍí. These are Pèṭa, Paṭṭaṇa, Bandar, Nagar, &c., relating to Kesavaṇṇa. The Nagars formed by Basavaṇṇa are 1 Mangalúru, 2 Kásaragóḍu, 3 Múlki, 4 Viṭṭhala, 5 Uḷḷála, 6 Banṭwáḷa, Maṇélu, 8 Uḍupi, 9 Paṇambúru, 10 Nellikára, 11 Manjéçvara, 12 Néranki, 13 Páṇi Mangalore, 14 Maradáḷa 15 Valalanke and 16 Sulya.

These are the cities founded by Basavaṇṇa. Here end these rules of Bhútáḷapánḍya.

Particulars of the classes following the Aḷiyasantána rules.

1 Bágeṭṭiṇáya, 2 Bonyaṇṇáya, 3 Pulyaṭṭaṇáya, 4 Sálaṇṇáya, 1 Bangaraṇṇáya, (belonging) to the class of Iravattúr. It is not customary to give male and female (children) to this (class). 2 Kundalaṇṇáya, 3 Pangalaṇṇáya, 4 Karbúraṇṇáya. These four classes are the same. There exists relationship between the abovementioned four classes such as Pulyaṭṭaṇṇáya, &c., while it does not exist between the three classes, namely Bargaḍaṇṇáya, Kellarabaṇṇáya and Hirébaṇṇáya. The two classes Uppuraṇṇáya and Uddaraṇṇáya are the same, as also the two classes Kóchaṭṭibaṇṇáya and Kóchiraṇṇáya. Even the two classes Sálabaṇṇáya and Aiyabaṇṇáya are the same, as also the two classes Nelabaṇṇáya and Ujaṭṭibaṇṇáya. The four classes Uḷibaṇṇáya, Kundónibaṇṇáya, Karambaraṇṇáya, and Barmaraṇṇáya have not any special classes proximate to them. Relationship is formed by them in all the classes. Total classes* 18.

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* These are only 16 classes, if calculated. S. A.

The rules made by Bhútáḷapâṇḍyaráya under the title of Aḷiyasantána and the causes which led to their origin, have been printed here on the authority of two copies, which, though containing several mistakes, have been corrected as far as possible. However, as copies sufficiently correct were not procurable, slight mistakes may have been left here and there. The people of this Tuḷu country purchase these rules which are printed here, and so, if all the copies are exhausted, and it appear proper that the said work should be re-printed, and good and correct copies be then procurable, an attempt will be made to rectify even the mistakes that have here been left behind.

The short story of Bhútáḷapáṇḍya, as also his rules, contain some circumstances which are to be considered minutely, and all those that are fond of truth should try to consider and know the same.

Respecting the story. We do not discuss here for the present whether Bhútarája (king of demons) existed or not. However, it is true that there are Bhútarájas and Piçáchás. Nevertheless, the assertion that Devapáṇḍya's ships sailed to a dark island covered with snow and there stuck to a miry bank is liable to suspicion. As Hindús are not acquainted with geography, it will not be surprising that if ships had ever sailed to a distant country never resorted to before by any body, and returned from their voyage, a story should have been invented to the effect that the ships returned after performing a voyage to a dark island covered with snow. If (we) sail westward we do not find anywhere a dark island covered with snow.

It is stated that on Dévapáṇḍya's wife saying she would not give any of her sons as a sacrifice, Dévapáṇḍya's younger sister, Satyavatí, prepared herself to give Bhútáḷapáṇḍya, otherwise called Jayapáṇḍya, as a sacrifice; that thereupon, all the riches that came on the ships of the said Devapáṇḍya were, for reason of the human sacrifice aforesaid, obtained by the sister's son of Bhútáḷapáṇḍya instead of by the children (sons); and that, therefore, the Aḷiyasantánadu Katturules have been made to the effect that for the future the rulers and the subjects should get (their) maternal uncles' estates just as the sister's son Bhútáḷapáṇḍya obtained his. If Devapáṇḍya's wife relinquished her claim to his property in order that her children's lives should be spared, even at the loss of property, rather than be offered as a sacrifice at a certain place and time, it is not just that it should be presumed that the wife of every one would behave in the same manner, and that so the Aḷiyasantána system should be introduced on setting aside the Makkaḷasantána system.

As regards rules: it has been told that the people of three castes such as Kshatriyas, Vaiçyas, and Çúdras have to follow the Aḷiyasantána (system) while Brahmans have to pursue that of the Makkaḷasantána. As the Brahmans were men of learning, wisdom and expertness, it was not possible to subject them to the Aḷiyasantána system, but, as the other caste people were weak in sense, Bhútáḷapáṇḍya made this rule for them. It is a timid person that is often put to fright*(a)*; otherwise, why were Brahmans not interfered with and this burden thrown upon the weak castes such as Banṭaru and Vakkaluru?

The Aḷiyasantána rules only entailed loss, ruin and distress on the people, but the people have not derived any advantage therefrom. All the possessions of Banṭas, Vakkals, &c., have for the most part become the property of the Brahmans, Musalmans and Christians. Any man would naturally have a great affection for his children and not for his nephews (sister's sons): consequently the manager of the estate alienates the land, &c. by mortgage or sale, and gives away the money to his wife and children in secrecy. The sister's sons, when they become heirs, succeed not only to the assets but also to debts contracted to any extent he chooses. The property falls into the hands of others. Moreover, what will be the fate of the children? Since they (the managers) attempt to keep in secrecy the money obtained by them illegally, even that (money) would almost fall away into the hands of others (strangers), and so (it) is neither for children nor for sisters' sons.

As sin, injustice, and vice increase in men, numbers of suits arise, even among the children of the same mother. Nephews (sister's sons) are not generally the sons of the same mother. Devapáṇḍya had only one sister and sister's son, (wherefore) every thing passed here smoothly. However if a person had two, three, four or five sisters and these have twenty or thirty children, it is very seldom that good understanding will exist among them all. While each of these sisters has been endeavouring to get the estate for her children, great injustice and deceit were practised and, suits being instituted (in regard to the same), the estate itself was sold to a merchant before the settlement of all (points therein.) Even the ready money was expended on account of Vakíls' fees, false documents, false witnesses and also on account of bribes (to be given) to Gumáshtas and Munshis. Thus, the property, wealth, money, honours, happiness and pleasure of the followers of Aḷiyasantána system having fallen short (by degrees), the curse pronounced by Bhútáḷapáṇḍya to the effect that the line of the family should become extinct has come to pass. This however, is not owing to deviation from

(a) This is a proverb:—ಹೆದರುವವನಂನು ಹೆದರಿಸುವದು ಹೆಚ್ಚು.

these rules but to adherence thereto. It is because the Musalmans and Christians of this very Tuḷu country act against Bhūtáḷapáṇḍya's rules, that they live happily. But those that do not trangress the rules of Bhūtáḷapáṇḍya, will in course of days, turn poor and come to decline.

Since these rules run counter to the dictates of nature and also cause injustice, poverty and various difficulties, all that follow the Aḷiyasantána system should consider whether they have any means of giving up these rules.

An easy course to be pursued is as follows.

There is a Legislative Council at Calcutta, the capital of Hindústan, by means of which even the followers of the Aḷiyasantána system may get their object accomplished. The wise Hindú gentlemen of Bengal having taken a view of the difficulties arising from the prohibition of the re-marriage of widows addressed the Legislative Council requesting that, if the re-marriage of widows should take place, the children born of them may be allowed to have a claim to inherit. The Legislative Council passed an Act acccordingly, which received the assent of the Governor General. If all the gentlemen of the Tuḷu country following the Aḷiyasantána rules, would likewise consent to Makkaḷasantána (inheritance in the line of sons) and so present their address to the Legislative Council, there is no doubt that the Aḷiyasantána system would be done away with and the Makkaḷasantána system introduced in its stead. Even though all (the said families) should not join together; yet, if the sister's sons and sons of one family at least, would concur and make an address to the effect that the Makkaḷasantána system should be made to prevail among them thenceforward, there would be no hindrance to such Makkaḷasantána system taking effect among them alone. However in so doing it will not be proper to recognize merely the son's right to the exclusion of the daughters, as do the Brahmans who are the followers of Makkaḷasantána system. If a petition be presented to the effect that in case of the introduction of the Makkaḷasantána system the male and female children may reciprocally have an equal title like the nephews (sister's sons) and nieces in a family governed by Aḷiyasantána rules, there will be no obstacle to the petition being complied with accordingly.

In speaking of the rules of this Bhūtálapáṇḍya, we have voluntarily omitted the religious matters: though the several religions have a connection with the circumstances and rights of the peoples (that respectively profess the same), yet we have left those matters alone, and mentioned here only what is advantageous to the community for the present. If all who read this, especially the followers of the Aḷiyasantána system, will consider what is said here through affection (for them) and make their attempts, so as to improve themselves for the future, we, and at last they also, will derive happiness. Let God shew favour to all!

NOTE *by the Translator*:—The original hereof, besides containing words from the Old-Canarese, the Tuḷu and the Sanskrit languages, is also unintelligible here and there because of omissions of verbs and mistakes in the use of tenses and cases. As I was directed to translate closely, I beg to be excused for the unidiomatic expressions which must always be found in a literal version.

M. O. SINGALA'CHA'RIYA'R.

June 1864.

	1862.	Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced	
					Shade		Sun	Grass	Dew Point.	Humidity.
			Dry	Wet	Max.	Min.	Max.	Min.		
		Inches.	°	°	°	°	°	°	°	Per ct.
January; first half.	1	29·950	74·6	68·2	79·6	68·7	87·9	65·5	64·8	73
	2	29·953	73·4	68·5	81·2	71·2	97·2	69·5	66·0	78
	3	29 960	72·8	70·4	77·3	68·7	—	67·0	69·3	89
	4	29·987	76·5	73 9	79·9	71·9	99·5	72·0	72·8	89
	5	29·970	77 4	74 1	82·5	72·7	105·2	72·2	72·7	86
	6	29·976	76·7	73·3	82·4	70·7	111·8	69·0	71·8	85
	7	29·988	77 5	73·6	83·0	71·7	108·9	69 0	71·9	83
	8	29·934	77·9	73·6	83·9	73·7	109·5	71·2	71·8	82
	9	29 914	77·5	73·9	83·9	71·2	104·3	68·8	72·3	85
	10	29 940	77·4	74·0	83·5	72·8	104·9	70·6	72·5	85
	11	29·977	77·9	73·4	82·7	74·2	105·7	70·5	71·4	81
	12	29·980	75·6	72 0	82·4	70·1	103·6	66·8	70 3	85
	13	29·962	76·4	71·2	82·4	70·2	106·7	66·4	68 7	78
	14	30·000	75·9	70·9	81·9	67·7	102·9	62·9	68·5	79
	15	30·022	76·9	71·6	82·2	·70·7	104·7	67·3	69·1	78
Mean.........		29·968	76·3	72 2	81 9	71·1	—	68·6	70·3	82
Average......		30 004	74·6	68·9	80·0	69·1	—	64·7	66·0	76
Difference...		— 0·036	+ 1·7	+ 3·3	+ 1·9	+ 2·0	—	+ 3·9	+ 4·3	+ 6
January, second half.	16	30·027	75·6	69·8	80·8	67·6	107·7	64·0	66·9	76
	17	30·016	75·1	68·8	81·2	67·4	108 0	63·1	65·6	73
	18	30·038	75·4	69·0	81·5	67·2	110·7	63·7	65·7	73
	19	30·034	75·9	69·7	81·0	67·2	106·8	63·0	66·6	74
	20	30·022	76·5	69·6	81·7	71·9	103·4	68·0	66·1	71
	21	30·009	74·1	67·3	80·3	69·3	104·0	65·9	63 6	71
	22	30·028	75·1	66·9	80·7	69·7	105·4	64·9	62·3	66
	23	30·002	75·7	68·1	81·4	70·2	104·6	66·2	64·0	69
	24	29·992	75·7	68·1	80·4	68·7	102·4	67·4	64·0	69
	25	29·993	74·6	67·6	80·9	68·7	103·4	64·0	63·8	70
	26	29·943	73·4	67·8	81·2	66·5	104·7	63·5	64·8	76
	27	29·868	72 2	69·4	80·7	64·6	105·0	60 3	68·0	87
	28	29·875	74·8	71·0	81·7	66·7	108·9	63·1	69·2	84
	29	29·938	75·4	70·0	81·8	68 3	109 0	65·2	67·3	77
	30	29·950	75·5	69·7	82·3	67·7	104·7	64 0	66·8	76
	31	29·935	74·1	68·3	81·5	68·9	106·1	65·5	65·2	75
Mean.........		29·979	74·9	68·8	81·2	68·2	105·9	64·5	65·7	74
Average.....		29 991	74·5	68·6	80·6	68·2	—	65·2	65·5	75
Difference...		— 0·012	+ 0·4	+ 0·2	+ 0 6	0·0	—	— 0·7	+ 0·2	— 1

Rain	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	105	116	0	1	97	Overcast.
—	94	129	31	1	30	Fine.
0·02	105	139	31	1	100	Overcast.
0 05	110	97	3	4	60	do. till night.
—	73	35	5	11	37	Light clouds, clear night.
0·02	31	75	11	8	47	Light clouds.
—	29	61	9	10	80	Nearly overcast.
0·05	66	63	10	14	30	Light clouds.
0·07	42	78	17	14	53	Cloudy.
0·17	57	56	17	13	67	Showery.
—	53	66	13	11	73	Cloudy.
—	28	74	10	11	53	Fine.
—	60	41	11	12	37	do.
—	27	66	11	9	10	do.
—	41	68	9	9	23	do.
0·38	139 per day.		E		53	
0·64	139 per day.		N E		42	
—0·26	0		4 Points E		+11	
—	29	69	8	8	27	Nearly fine.
—	42	68	8	8	27	do.
—	52	62	7	6	27	Light clouds.
—	44	69	6	6	37	do.
0·11	82	94	6	6	53	do.
—	62	80	3	3	40	do.
—	46	87	3	5	40	Flying clouds.
—	83	107	5	5	43	do.
—	78	115	4	5	33	Light clouds.
—	81	86	5	4	33	do.
—	47	72	3	4	63	Cloudy.
—	32	48	1	7	63	do.
—	30	65	5	6	50	Light clouds.
—	42	76	6	5	37	Fine.
—	64	40	5	3	53	Light clouds.
—	54	65	3	6	53	do.
0·11	129 per day.		N E b E		42	
0·37	133 per day.		N E b E		31	
—0·26	— 4		None.		+11	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced	
					Shade		Sun	Grass		
			Dry	Wet	Max.	Min.	Max.	Min.	Dew Point.	Humidity.
		Inches.	°	°	°	°	°	°	°	Per ct.
February, first half.	1	29·916	74·6	68·2	81·6	67·2	105·3	63·3	64·8	73
	2	29·923	74·3	68·9	81·3	65·7	107·7	63·5	66·1	76
	3	29·911	75·7	69·6	82·9	69·4	110·9	66·0	66·5	75
	4	29·900	74·7	70·4	82·0	67·5	105·5	63·9	68·3	82
	5	29·939	76·1	70·6	82·1	66·4	103·5	62·8	67·9	77
	6	29·985	76·1	70·0	83·1	67·2	108·9	63·6	66·9	75
	7	29·990	75·0	69·0	82·3	66·7	107·6	62·8	65·9	74
	8	30·006	74·8	66·8	81·7	68·3	101·9	63·8	62·3	66
	9	30·040	74·7	66·2	81·0	66·5	107·7	63·5	61·3	64
	10	30·018	75·7	67·9	82·0	69·5	105·0	65·0	63·7	68
	11	30·011	75·7	69·7	82·1	66·5	108·0	62·8	66·7	75
	12	30·041	78·4	72·4	83·3	75·1	106·1	72·0	69·6	75
	13	30·022	76·2	71·7	81·0	76·8	96·7	74·0	69·6	81
	14	29·999	78·5	72·4	84·0	75·9	108·0	73·4	69·6	75
Mean……		29·979	75·8	69·6	82·2	69·2	105·9	65·7	66·5	74
Average..		29·982	75·6	69·8	81·8	69·0	103·2	65·7	66·9	75
Difference…		– 0·003	+ 0·2	– 0·2	+ 0·4	+ 0·2	+ 2·7	0·0	– 0·4	– 1
February; second half.	15	29·960	77·7	70·9	83·6	72·0	107·7	69·0	67·6	73
	16	29·959	77·3	70·8	84·0	71·2	109·8	69·4	67·6	73
	17	29·943	77·0	70·4	83·5	70·1	105·7	67·3	67·1	73
	18	29·947	76·3	70·7	82·9	69·5	104·9	67·1	67·9	77
	19	29·968	75·9	70·5	82·8	66·7	109·5	63·5	67·9	77
	20	29·948	77·5	68·6	83·8	67·2	109·7	62·4	63·8	64
	21	29·908	75·4	67·7	84·8	65·6	109·0	61·2	63·5	68
	22	29·911	74·9	69·4	84·5	65·6	106·4	61·2	66·7	76
	23	29·915	74·9	69·5	84·0	64·9	105·7	60·0	66·8	77
	24	29·930	74·6	70·3	84·2	65·9	105·2	61·1	68·2	82
	25	29·930	76·0	70·3	83·7	66·9	105·7	62·8	67·5	76
	26	29·874	73·7	67·7	83·3	65·9	105·9	61·5	64·5	74
	27	29·849	76·8	67·3	88·1	63·5	103·4	58·3	61·9	61
	28	29·883	79·4	75·1	87·5	70·7	106·1	67·0	73·3	82
Mean… ….		29·923	76·2	69·9	84·3	67·6	106·8	63·7	66·8	74
Average…..		29·958	76·9	70·8	83·8	69·7	103·9	64·2	67·9	75
Difference ..		–0·035	– 9·7	– 0·9	+ 0·5	– 2·1	+ 2·9	– 0·5	– 1·1	– 1

Rain	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	44	70	5	5	30	Light clouds : clear night.
—	60	66	3	5	33	Hazy : clear at night.
—	42	70	3	5	37	Hazy.
—	42	60	5	9	43	Nearly fine.
—	54	31	7	6	23	Fine.
—	58	78	6	7	23	Nearly fine.
—	39	92	3	5	73	Chiefly overcast.
—	92	79	7	5	57	Cloudy.
—	72	75	5	5	57	do.
—	77	90	5	6	47	do.
—	68	103	5	5	37	Light clouds.
—	101	128	5	5	87	Chiefly overcast.
—	111	107	4	3	100	Overcast.
—	90	99	3	3	73	Cloudy.
0·00	150 per day.		N E b E		51	
0·27	125 per day.		East.		28	
—0·27	+ 25		3 Points N		+23	
—	42	75	2	6	47	Hazy.
—	48	114	3	4	43	do.
—	48	104	1	2	60	Light clouds.
—	49	91	2	3	27	Fine.
—	39	83	1	3	17	do.
—	38	67	3	5	20	do.
—	33	60	6	8	0	do.
—	37	51	12	11	0	do.
—	33	54	13	8	0	do.
—	39	43	10	10	0	do.
—	38	61	11	10	3	Light haze.
—	37	44	10	8	13	Fine.
—	35	73	12	13	17	Light haze.
—	73	71	18	14	17	Nearly fine.
0·00	113 per day.		E b N		19	
0·05	119 per day.		E S E		23	
—0·05	— 6		3 Points N		— 4	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced	
					Shade.		Sun.	Grass.		
			Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.
		Inches.	°	°	°	°	°	°	°	Per ct.
March ; first half.	1	29·896	79·4	74·8	86·9	71·7	102·9	67·0	72·9	81
	2	29·886	79·6	73·5	87·9	73·9	105·4	70·7	70·8	76
	3	29·908	80·5	74·5	88·6	73·6	105·9	69·0	71·9	76
	4	29·963	79·2	72·7	86·4	72·0	103·5	67·5	69·7	73
	5	29·930	79·1	72·6	86·9	71·3	106·3	66·7	69·6	73
	6	29·934	78·5	71·8	86·1	71·3	100·3	67·8	68·5	75
	7	29·975	79·1	72·6	86·3	71·5	103·7	67·2	69·6	73
	8	29·986	78·4	71·1	86·3	69·7	104·4	65·2	67·6	71
	9	29·947	78·8	71·6	86·1	69·9	109·9	66·5	68·2	71
	10	29·894	80·2	74·9	87·0	71·9	105·1	68·3	72·7	77
	11	29·888	81·5	75·7	89·1	73·9	106·7	70·4	73·3	77
	12	29·940	80·8	75·3	88·7	74·2	106·8	70·4	73·0	78
	13	29·966	80·8	74·4	88·1	73·3	110·9	70·0	71·6	74
	14	29·995	80·4	73·8	88·2	74·2	109·7	70·8	70·9	74
	15	30·007	79·4	71·2	86·7	71·7	107·7	67·6	67·2	67
Mean........		29·941	79·7	73·4	87·3	72·3	105·9	68·3	70·6	74
Average.....		29·920	78·9	72·7	85·5	71·7	105·1	67·5	69·9	75
Difference..		+ 0·021	+ 0·8	+ 0·7	+ 1·8	+ 0·6	+ 0·8	+ 0·8	+ 0·7	— 1
March ; second half.	16	29·979	78·1	71·0	87·0	71·7	110·8	67·5	67·8	72
	17	29·938	77·2	72·6	96·4	69·8	109·5	65·2	70·5	81
	18	29·912	78·6	73·5	87·3	69·8	108·6	64·8	71·3	79
	19	29·938	79·8	73·4	87·1	72·5	112·9	68·6	70·6	74
	20	29·909	78·7	72·4	87·9	71·4	108·0	67·2	69·5	74
	21	29·854	79·0	70·8	90·8	71·3	117·4	67·5	66·8	67
	22	29·836	78·7	69·1	90·7	69·4	116·5	63·3	64·1	62
	23	29·835	78·6	68·9	90·9	66·1	113·6	64·7	63·7	62
	24	29·857	80·9	73·2	89·8	68·7	114·2	64·0	69·7	70
	25	29·886	81·3	75·1	90·5	73·2	114·3	69·4	72·5	75
	26	26·870	81·6	75·3	91·1	77·0	113·7	74·8	72·7	75
	27	29·850	82·2	75·6	89·4	75·7	118·8	73·8	72·8	74
	28	29·883	82·5	77·3	89·6	78·3	105·2	75·6	75·3	79
	29	29·917	81·4	76·6	89·2	77·7	105·2	76·1	74·7	81
	30	29·867	83·0	75·8	91·2	75·0	108·7	71·0	72·8	72
	31	29·886	85·0	76·7	91·7	77·3	108·2	73·4	73·3	69
Mean........		29·889	80·4	73·6	89·4	72·8	111·6	69·2	70·6	73
Average.....		29·886	80·9	74·9	87·5	74·2	108·6	69·8	72·4	76
Difference...		+ 0·003	— 0·5	— 1·3	+ 1·9	— 1·4	+ 3·0	— 0·6	— 1·8	— 3

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	72	87	16	14	13	Fine.
—	68	96	19	14	10	do.
—	76	106	19	14	17	Light clouds.
—	60	111	17	13	27	Fine with passing clouds.
—	76	83	19	14	0	Fine.
—	64	74	17	15	13	do.
—	50	68	18	12	17	Flying clouds.
—	31	73	17	9	17	Light clouds.
—	36	92	2	12	10	Fine.
—	71	84	8	12	13	do.
—	55	101	19	13	20	Light clouds.
—	47	101	16	12	13	Fine.
—	36	64	12	11	40	Frequent clouds.
—	52	79	11	8	30	do.
—	41	98	7	6	30	Light clouds.
0·00	143 per day.		S S E		18	
0·05	123 per day.		S E		23	
— 0·05	+ 20		2 Points S		— 5	
—	44	65	5	5	17	Fine.
—	45	57	3	7	10	Light clouds.
—	47	45	5	7	40	Cloudy.
—	27	77	4	7	43	do.
—	42	64	5	7	7	Fine.
—	45	29	30	7	0	do.
—	51	50	30	6	23	Light haze.
—	34	67	26	6	17	Fine.
—	44	56	26	6	7	do.
—	34	97	25	3	27	Light clouds.
—	102	81	30	3	33	Flying clouds.
—	56	43	27	8	23	Fine with passing clouds.
—	79	96	17	15	37	Flying clouds.
0·01	85	75	16	14	37	do.
—	61	108	18	14	7	Fine.
—	95	95	17	13	40	Frequently clouded.
0·01	125 per day.		E N E		23	
0·32	101 per day.		S S E		28	
—0·31	+ 24		8 Points N		— 5	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.	
					Shade.		Sun.	Grass.	Dew Point.	Humidity.
			Dry.	Wet.	Max.	Min.	Max.	Min.		
		Inches.	°	°	°	°	°	°	°	Per Ct.
April; first half.	1	29·888	83·2	76·5	90·2	76·9	107·8	73·8	73·8	74
	2	29·867	83·5	76·0	91·2	75·1	107·7	71·0	72·9	71
	3	29·862	82·9	75·2	90·5	75·5	105·7	71·4	71·9	71
	4	29·886	81·8	75·6	89·6	73·0	103·1	68·4	73·0	75
	5	29·917	80·8	73·2	88·7	72·5	102·4	67·8	69·7	70
	6	29·922	80·5	73·2	88·5	70·6	104·2	66·0	69·7	70
	7	29·881	81·3	73·9	89·3	71·7	107·7	66·7	70·6	71
	8	29·862	81·1	75·6	90·9	71·6	115·5	67·0	73·3	78
	9	29·871	82·2	74·9	90·2	72·8	108·3	68·2	71·8	72
	10	29·892	82·2	75·2	92·3	72·2	113·2	67·4	72·2	73
	11	29·928	81·8	75·2	90·5	72·5	111·2	68·1	72·4	74
	12	29·941	81·0	74·9	90·9	72·8	112·6	69·2	72·3	76
	13	29·955	82·3	75·8	91·6	72·2	114·5	66·8	73·1	74
	14	29·894	83·0	76·9	90·7	73·7	108·2	69·4	74·5	76
	15	29·835	84·8	76·3	94·0	76·6	116·1	71·9	72·8	68
Mean		29·893	82·2	75·2	90·6	73·3	109·3	68·9	72·2	73
Average......		29·843	83·1	77·0	90·0	77·4	107·6	71·3	74·6	76
Difference...		+ 0·050	— 0·9	— 1·8	+ 0·6	— 4·1	+ 1·7	— 2·4	— 2·4	— 3
April; second half.	16	29·803	84·7	78·6	93·0	78·6	114·3	75·9	76·3	77
	17	29·804	85·4	79·6	93·6	79·6	114·2	77·2	77·5	78
	18	29·790	85·4	80·5	92·3	69·8	111·7	78·0	78·8	81
	19	29·777	85·4	81·9	92·7	80·8	108·1	79·0	80·7	86
	20	29·805	85·3	82·3	91·8	81·1	106·3	79·2	81·3	88
	21	29·831	85·2	80·9	91·9	80·8	107·1	79·0	79·4	83
	22	29·859	83·4	76·5	91·5	79·3	104·7	77·0	73·7	73
	23	29·858	83·6	76·1	91·7	75·1	109·3	71·2	73·0	71
	24	29·821	84·9	77·4	93·2	75·9	113·5	72·6	74·4	71
	25	29·755	85·3	79·3	92·9	77·8	110·8	74·7	77·1	77
	26	29·703	86·1	80·8	93·3	79·8	108·7	78·0	78·9	80
	27	29·718	86·1	81·7	92·5	81·2	107·3	79·0	80·2	83
	28	29·737	86·4	82·8	93·8	81·3	107·7	78·7	81·6	86
	29	29·742	86·2	83·2	93·2	81·8	108·0	79·8	82·3	88
	30	29·724	86·6	84·2	92·5	81·8	110·9	79·5	83·4	94
Mean......		29·782	85·3	80·4	92·7	79·6	109·5	77·3	78·6	81
Average,....		29·806	84·0	77·6	91·0	78·4	—	76·4	75·1	75
Difference...		— 0·024	+ 1·3	+ 2·8	+ 1·7	+ 1·2	—	+ 0·9	+ 3·5	+ 6

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	67	116	16	14	40	Light clouds.
—	65	105	17	15	37	do.
—	67	90	19	15	0	Clear.
—	71	84	18	15	7	Fine.
—	79	59	16	14	7	do.
—	39	69	15	11	3	do.
—	49	74	17	13	0	do.
—	75	63	19	15	60	Cloudy.
—	54	77	17	14	0	Fine.
—	55	87	19	13	0	do.
—	37	71	21	11	7	do.
—	52	59	19	14	13	Light haze.
—	43	63	14	13	3	Fine.
—	48	86	16	14	0	do.
—	72	105	18	14	27	Hazy.
0·00	139 per day.		S b E		14	
0.16	145 per day.		S S E		26	
—0·16	— 6		1 Point S		—12	
—	90	118	16	15	7	Fine.
—	87	110	18	15	7	do.
—	108	99	18	15	27	Light clouds.
—	134	105	17	13	0	Fine.
—	118	114	16	14	27	Flying clouds.
—	101	111	15	14	30	do.
—	88	78	15	14	30	Light clouds : clear night.
—	51	100	14	14	13	Hazy.
—	56	110	16	14	13	Fine with passing clouds.
—	87	95	17	14	10	Light haze.
—	92	131	17	14	7	Fine.
—	134	95	17	14	13	do.
—	101	123	16	15	17	Hazy.
—	113	122	15	14	23	Frequently clouded.
—	104	116	16	13	40	Fine with passing clouds.
0·00	206 per day.		S b E		18	
0·65	146 per day.		S b E		34	
—0·65	+ 60		None.		—16	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.	
					Shade.		Sun.	Grass.		
			Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.
		Inches.	°	°	°	°	°	°	°	Per ct.
May; first half.	1	29·772	85·6	82·6	93·0	80·8	105·5	78·8	81·6	88
	2	29·761	85·9	79·5	93·0	80·5	106·2	77·2	77·2	76
	3	29·783	86·4	79·2	93·4	80·4	106·0	78·0	76·5	73
	4	29·826	86·3	78·8	93·5	80·6	107·7	78·2	75·9	72
	5	29·866	86·2	77·9	94·5	80·7	109·5	77·8	74·7	69
	6	29·815	85·5	78·3	91·3	80·2	103·4	78·0	75·6	73
	7	29·816	80·7	74·1	87·3	79·1	100·2	77·0	71·2	74
	8	29·792	85·9	77·1	96·2	76·0	116·0	72·4	74·4	74
	9	29·828	87·2	78·2	93·3	78·6	113·7	75·5	74·7	67
	10	29·816	85·2	77·6	93·5	78·6	114·6	76·0	74·6	71
	11	29·766	86·6	76·9	94·5	78·6	113·9	76·0	72·9	65
	12	29·712	88·2	79·4	97·2	80·6	113·6	78·8	76·1	69
	13	29·742	89·0	77·1	97·7	81·3	116·8	77·5	72·2	59
	14	20·792	90·0	79·4	101.1	82·6	116·1	79·8	75·4	63
	15	29·796	89·8	78·9	100·3	82·7	117·6	80·0	74·7	62
Mean..........		29·792	86·6	78·3	94·7	80·1	110·7	77·4	75·2	70
Average.....		29·756	85·3	78·1	93·0	79·8	110·8	77·5	75·4	73
Difference...		+ 0·036	+ 1·3	+ 0·2	+ 1·7	+ 0·3	— 0·1	— 0·1	— 0·2	— 3
May; second half.	16	29·752	87·6	77·5	106·8	83·3	122·2	78·5	73·4	64
	17	29·721	87·8	78·5	106·1	81·6	124·5	77·8	74·9	67
	18	29·749	90·6	79·6	103·4	82·3	122·5	79·1	75·4	62
	19	29·811	88·9	74·8	101·2	82·7	115·0	80·3	68·4	53
	20	29·776	89·6	77·6	100·7	82·0	115·5	78·5	72·7	59
	21	29·725	89·4	78·5	102·0	83·4	117·7	80·3	74·2	62
	22	29·746	89·5	77·8	99·1	82·6	117·7	80·9	73·1	60
	23	29·824	84·3	79·0	95·2	76·8	112·7	71·6	77·0	79
	24	29·829	86·3	79·6	95·0	81·0	109·5	79·2	77·1	75
	25	29·807	87·6	79·6	97·4	80·8	110·7	79·0	76·7	71
	26	29·761	89·2	79·8	97·6	81·8	113·5	79·8	76·3	67
	27	29·746	90·0	79·2	97·5	81·8	113·0	78·9	75·1	63
	28	29·714	89·6	77·0	103·5	82·6	119·7	79·8	71·8	57
	29	29·689	90·1	77·7	103·9	83·4	122·0	80·3	72·7	58
	30	29·675	88·3	79·9	107·1	82·8	121·5	78·5	76·8	70
	31	29·701	90·3	78·2	101·9	79·8	109·5	76·0	73·4	59
Mean..........		29·752	88·7	78·4	101·2	81·8	116·7	78·7	74·4	64
Average.....		29·707	86·2	77·5	95·1	80·4	115·3	78·3	74·1	68
Difference...		+ 0·045	+ 2·5	+ 0·9	+ 6·1	+ 1·4	+ 1·4	+ 0·4	+ 0·3	— 4

Rain	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	93	113	15	14	30	Light haze ; fine night.
—	91	128	15	14	17	Light haze.
—	95	122	17	14	43	Frequently clouded.
—	88	120	15	14	20	Hazy.
—	93	98	15	14	73	Cloudy.
—	78	102	17	4	70	Nearly overcast.
—	94	57	4	9	77	Cloudy. A slight dust storm from N. E. about 8½ A. M.
—	49	102	14	9	23	Fine.
—	37	80	12	8	57	Hazy clouds.
—	36	66	10	8	60	Cloudy.
—	54	96	14	10	17	Fine.
—	83	121	16	12	40	Light clouds.
—	80	120	15	13	37	do.
—	124	127	16	14	60	Occasional clouds.
—	90	123	16	13	57	Frequent clouds.
0·00	184 per day.		S E by S		45	
1·32	157 per day.		South		39	
—1·32	+ 27		3 Points N		+6	
—	108	62	17	14	47	Light clouds till night.
—	119	88	19	15	40	Light clouds.
—	90	127	16	13	40	Morning fine ; afternoon cloudy.
—	99	88	16	17	37	do. ; do.
—	80	129	16	13	7	Fine.
—	131	156	16	13	7	do.
—	141	165	15	13	10	Hazy.
0·60	112	77	17	13	27	Rain about 6 A. M. with N. W. wind, fine afterward.
—	147	108	16	14	20	Light clouds.
—	105	113	16	14	0	Fine.
—	124	98	16	13	13	do.
—	73	94	16	13	10	do.
—	112	60	19	15	40	Frequent clouds. Thunder and lightning.
—	122	92	20	15	53	Cloudy and threatening : do.
—	105	85	17	15	93	Overcast.
—	75	139	21	16	80	do.
0·60	214 per day		South		33	
1·60	195 per day		S S W		47	
—1·00	+19		2 Points S		—14	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.	
					Shade.		Sun.	Grass.	Dew Point.	Humidity.
			Dry.	Wet.	Max.	Min.	Max.	Min.		
		Inches.	°	°	°	°	°	°	°	Per ct.
June ; first half.	1	29·752	79·6	75·7	93·5	73·8	114·2	73·0	74·1	83
	2	29·735	86·8	79·5	96·4	78·1	114·5	76·0	76 8	73
	3	29·752	87·3	79 6	94·7	80·6	111·7	78·6	76 8	72
	4	29·715	87·9	80·9	96 8	80 1	115·5	78·2	78·4	74
	5	29·669	88·3	79·8	101 1	81 6	118·3	79·3	76·7	69
	6	29 679	87 5	78·6	102·6	79 0	121·5	76·8	75·2	68
	7	29·700	85·1	80·5	97·7	73·6	113 4	73·0	78·9	82
	8	29·732	87·5	79·5	97·9	80·6	112·5	77·4	76·6	71
	9	29·725	88·6	80·9	100·9	81·4	116·3	80 2	78·2	72
	10	29·691	88·0	80·6	102·1	82·6	115 6	80 2	78·0	73
	11	29·668	91·7	75·2	103·6	82·6	114 6	79·8	67·8	47
	12	29·704	90·5	72·3	103·9	81·8	115·4	79·0	63·1	42
	13	29·743	87·3	77 8	95·2	81·6	109 8	80·4	74·1	65
	14	29·759	88·3	76·8	1 01·1	82·4	115·7	8·10	72·1	59
	15	29.749	87·0	76.4	101·2	82·6	114·5	79·4	72·0	62
Mean......		29·718	87·4	78 3	99·2	80·2	114·9	78·2	74·8	67
Average.....		29·692	86·6	76·7	95·8	80·7	111·7	77·5	72·7	64
Difference...		+ 0·026	+ 0·8	+ 1·6	+ 3·4	– 0·5	+ 3·2	+ 0·7	+ 2·1	+ 3
June ; second half.	15	29·678	88 2	76·9	99·1	83·1	111·8	81·3	72·3	60
	16	29·707	82·9	77·1	94·7	78·1	113·3	75·5	74·8	78
	17	29·750	83·1	74·5	90·4	79·6	95·5	76·3	70·7	67
	18	29·756	85 9	76·5	100·0	80·6	116·2	78·0	72·6	66
	19	29·747	82·7	77·8	94·8	76·6	116·7	73·2	75·9	80
	20	29·701	86 0	76 6	95·6	77·6	113·0	74·7	72·7	66
	21	29·672	87 2	75·8	96·7	78·1	116 9	74·0	70·9	60
	22	29·666	87·1	77·0	95·7	79 6	116·5	76·5	72·9	64
	23	29·682	84·9	77·8	100·5	79·6	116·8	75·0	75·0	74
	24	29·679	86·5	76 5	94·0	79·6	101·5	76·4	72·3	64
	25	29·651	86·3	75·8	96·7	80·7	107·1	78·2	71·3	62
	26	29·604	89·9	76·1	100·7	80·6	111·5	77·2	70·1	54
	27	29·598	91·1	74 9	99·7	83·0	108·5	77·5	67·5	48
	28	29·597	87·4	75·0	99·6	84·0	110·9	80 8	69·5	57
	30	29·618	88·2	76·0	98·2	77·6	111.5	74·4	70·8	58
Mean...		29·674	86·5	76 3	97·1	79·9	111·2	76·6	72·1	64
Average.....		29·704	85 0	76·1	93·7	79 4	108·9	77·3	72·4	67
Difference ..		– 0·030	+ 1·5	+ 0·2	+ 3·4	+ 0·5	+ 2·3	– 0 7	– 0·3	– 3

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
0·16	92	50	22	15	70	Cloudy.
—	80	87	17	16	53	Hazy clouds.
—	64	122	16	14	20	Nearly fine.
—	83	118	18	13	30	Hazy.
—	106	160	17	14	20	Fine.
02·6	98	114	19	12	40	Changeable.
—	112	89	18	16	80	Nearly overcast.
—	129	102	19	14	57	Light clouds.
—	120	97	18	19	40	do.
—	77	132	22	17	57	Cloudy.
—	87	126	18	21	57	do.
—	108	136	19	17	53	Light clouds.
0·00	88	129	16	14	53	do.
—	83	97	20	15	70	Changeable.
	62	83	20	14	77	Heavy clouds.
0·42	202 per day.		S by W		52	
0·92	201 per day.		S W		60	
—0·50	+ 1		3 Points S		— 8	
0·57	84	128	18	15	50	Threatening and stormy.
0·25	57	62	16	18	70	Overcast.
—	53	57	23	14	93	do.
0·73	71	78	19	15	63	Flying clouds : thunder storm about [midnight.
1·09	120	70	20	14	67	Nearly overcast : light storm about [7 P. M.
—	80	107	21	12	23	Light clouds.
—	85	93	22	10	13	Nearly fine.
0·28	76	97	21	12	40	Cloudy : rain about 7 P. M.
0.01	57	80	22	16	40	Cloudy : light shower at 4 P. M.
—	84	80	22	18	70	Nearly overcast.
0·01	83	67	23	19	77	Cloudy : shower at 8 P. M.
0·04	78	93	21	19	67	Cloudy : rain at 7 P. M.
—	94	91	22	23	70	Nearly overcast.
0·27	101	104	23	26	90	Overcast : frequent showers.
—	68	88	18	18	70	Overcast : fall about 6 P. M.
3·25	166 per day.		S W by S		60	
1·29	190 per day.		S W		70	
+1·96	—24		1 Point S		—10	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature. Dry.	Corrected Mean Temperature. Wet.	Self Registering Thermometers. Shade. Max.	Self Registering Thermometers. Shade. Min.	Self Registering Thermometers. Sun. Max.	Self Registering Thermometers. Grass. Min.	Deduced Dew Point.	Deduced Humidity.
		Inches.	°	°	°	°	°	°	°	Per ct.
July; first half.	1	29·689	87·9	76·1	97·6	81·4	112·6	76·8	71·1	59
	2	29·736	86·8	77·2	100·7	81·7	114·5	77·9	73·3	65
	3	29·738	86·9	78·7	97·6	80·6	113·5	78·4	75·6	70
	4	29·718	85·1	78·1	99·5	82·1	117·7	79·4	75·4	74
	5	29·673	87·0	78·7	98·7	79·6	109·5	76·4	75·6	70
	6	29·671	88·4	76·2	99·2	79·8	108·5	76·0	71·1	58
	7	29·684	83·6	76·2	97·2	77·2	105·3	76.2	73·2	72
	8	29·699	84·8	78·0	95·9	76·7	115·7	74·7	75·4	75
	9	29·704	84·2	78·7	95·0	78·8	105·5	76·5	76·6	78
	10	29·729	80·9	75·8	95·4	75·2	114·7	71·9	73·7	80
	11	29·688	82·2	77·7	95·6	73·7	112·0	72·0	75·9	82
	12	29·671	85·2	77·7	94·3	74·8	106·6	71·8	74·7	71
	13	29·721	86·8	78·6	98·5	78·8	108·6	74·6	75·5	70
	14	29·701	86·2	80·3	99·5	80·4	111·9	77·0	78·2	77
	15	29·659	85·6	78·6	96·7	79·6	109·7	76·2	75·9	74
Mean.........		29·699	85·4	77·8	97·4	78·7	111·1	75·7	74·9	72
Average.....		29·708	84·3	76·0	92·6	78·8	—	75·5	72·6	69
Difference..		− 0·009	+ 1·1	+ 1·8	+ 4·8	− 0·1	—	+ 0·2	+ 2·3	+ 3
July; second half.	16	29·692	86·5	79·7	97·8	80.4	111·2	78·0	77·2	75
	17	29·674	84·4	79·6	97·7	79.9	107·5	76·8	77·9	82
	18	29·704	86·0	78·2	96·5	80.6	117·0	77·4	75·2	71
	19	29·712	86·9	79·5	98·9	80.6	111·7	78·0	76·4	73
	20	29·713	85·9	80·2	98·1	80.8	110·9	78·2	77·8	75
	21	29·689	85·7	81·1	100·1	80.6	122·0	77·5	79·5	82
	22	29·660	86·8	79·7	99·7	79.6	112·5	76·4	77·1	74
	23	29·667	86·7	78·1	100·0	82.3	117·5	78·5	74·7	68
	24	29·689	86·6	77·6	99·7	81·6	119·5	77·6	74·0	67
	25	29·681	85·5	76·4	98·4	82.4	113·0	78·0	71·5	67
	26	29·665	85·8	77·1	98·7	79.1	111·0	75·3	74·0	71
	27	29·658	87·4	75·9	99·6	80.8	109·5	76·2	71·0	59
	28	29·684	87·0	77·5	101·0	81.8	114·5	77·0	73·7	65
	29	29·711	86·3	77·6	99·8	81.8	114·7	76·5	74·2	68
	30	29·713	84·9	77·9	94·7	78·8	103·6	73·8	75·2	74
	31	29·773	80·7	75·9	87·5	76·9	96·2	74·7	73·9	81
Mean.........		29·693	85·8	78·3	98·0	80·5	112·0	76·9	75·5	72
Average.....		29·721	83·9	75·6	91·9	78·4	—	75·5	72·1	69
Difference...		− 0·028	+ 1·9	+ 2·7	+ 6·1	+ 2·1	—	+ 1·4	+ 3·4	+ 3

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	74	94	21	15	57	Cloudy.
—	62	103	20	15	50	Fine morning: cloudy afternoon.
0·02	78	63	20	15	57	Cloudy: shower $0\frac{1}{2}$ P. M.
0·23	88	66	18	15	57	Cloudy: rain from $1\frac{1}{2}$ to 5 P. M.
0·06	64	85	19	18	73	Chiefly overcast: rain after $10\frac{1}{2}$ P. M.
—	85	88	21	22	73	Overcast.
1·13	74	69	21	20	100	Overcast: rain from 5 to 9 P. M.
0·03	58	105	19	16	57	Cloudy: shower about $0\frac{1}{4}$ A. M
—	60	93	19	17	100	Overcast.
1·90	67	97	19	15	100	Overcast: heavy rain after 6 P. M.
0·86	88	101	20	17	70	Stormy: rain at 5 and 8 P. M.
—	77	78	21	18	83	Cloudy.
—	74	98	22	18	40	Light clouds.
—	89	93	21	17	47	do.
—	76	110	19	14	50	Occasional clouds.
4·23	164 per day.		S S W		68	
1·93	153 per day.		S W		74	
+ 2·30	+ 11		2 Points S		— 6	
—	77	99	18	16	33	Nearly fine.
—	70	96	20	17	83	Heavy clouds.
—	71	93	18	14	37	Light clouds.
—	77	100	18	16	57	Frequent clouds.
—	73	106	18	16	53	Hazy.
0·25	98	83	21	14	70	Cloudy: rain about 7 P. M.
—	77	100	19	16	37	Light clouds.
—	97	83	20	14	50	Cloudy.
—	78	84	20	13	47	Light clouds.
—	89	83	20	14	90	Overcast.
—	81	71	21	13	60	Hazy and dull.
—	75	83	20	18	77	Cloudy.
—	74	103	21	16	50	Light clouds.
—	89	78	21	15	20	Fine.
0·05	80	69	19	13	87	Overcast: shower about sun rise.
—	90	46	22	15	97	Overcast.
0·30	167 per day.		S by W		59	
1·98	156 per day.		S W by W		77	
− 1·68	+ 11		4 Points S		−18	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.	
					Shade.		Sun.	Grass.	Dew Point.	Humidity.
			Dry.	Wet.	Max.	Min.	Max.	Min.		
		Inches.	°	°	°	°	°	°	°	Per ct.
August; first half.	1	29·793	83·0	77·9	90·7	77·4	102·5	72·1	75·9	80
	2	29·775	86·6	78·2	96·9	78·7	111·5	74·1	75·0	69
	3	29·757	85·8	77·3	95·2	80·6	111·4	75·2	73·9	68
	4	29·780	79·2	76·2	85·0	71·1	90·6	67·8	75·0	87
	5	29·776	83·8	78·6	91·7	77·6	107·1	73·6	76·6	79
	6	29·728	83·8	77·1	91·5	77·4	105·5	72·8	74·4	74
	7	29·699	83·3	76·0	88·9	76·6	103·7	72·5	73·0	72
	8	29·685	82·1	74·2	92·3	78·1	100·7	71·5	70·7	69
	9	29·660	83·2	74·7	92·9	77·1	104·7	71·0	71·0	67
	10	29·665	81·1	75·3	92·3	78·0	105·2	71·7	72·9	77
	11	29·686	78·1	76·4	94·5	76·7	108·5	72·2	75·7	92
	12	29·656	83·7	77·9	93·5	76·8	103·0	71·2	75·7	78
	13	29·690	83·6	77·9	95·1	77·1	107·9	72·2	75·7	78
	14	29·761	84·5	77·6	97·3	76·6	112·5	72·3	74·9	73
	15	29·785	86·0	76·2	97·7	77·8	107·5	73·0	72·1	65
Mean........		29·726	83·2	76·8	93·0	77·2	105·7	72·2	74·3	75
Average......		29·749	83·5	76·0	91·6	78·1	—	72·5	72·9	71
Difference...		—0·023	—0·3	+ 0·8	+ 1·4	—0·9	—	—0·3	+ 1·4	+4
August; second half.	16	29·761	85·0	74·5	92·4	79·6	102·5	73·4	69·8	61
	17	29·732	85·3	75·0	95·0	78·8	105·7	73·8	70·5	62
	18	29·701	84·0	75·7	96·1	79·0	108·4	73·4	72·2	69
	19	29·715	83·6	75·8	97·0	78·0	114·5	71·0	72·5	71
	20	29·743	83·4	76·2	95·7	78·8	109·5	72·8	73·2	72
	21	29·755	84·6	75·5	94·7	79·1	119·7	74·2	71·6	67
	22	29·792	82·2	78·1	92·5	74·2	112·3	69·5	76·5	84
	23	29·780	83·5	78·1	92·7	76·1	108·5	72·5	76·1	79
	24	29·796	83·6	77·7	90·9	77·6	109·0	71·2	75·4	77
	25	29·773	84·5	77·8	96·8	78·6	110·7	72·8	75·2	75
	26	29·772	84·8	78·5	96·9	80·0	111·5	73·8	76·1	76
	27	29·773	85·5	76·7	96·7	79·6	114·5	73·8	73·1	68
	28	29·756	84·9	77·1	94·0	77·6	109·9	73·5	74·0	71
	29	29·753	85·2	77·5	94·8	77·8	114·5	73·4	74·5	71
	30	29·771	83·0	77·7	97·5	74·0	112·5	70·0	75·7	79
	31	29·788	82·1	77·5	94·8	75·9	119·5	72·7	75·7	82
Mean........		29·760	84·1	76·8	94·9	77·8	111·5	72·6	73·9	73
Average......		29·753	82·8	75·8	90·3	77·7	110·5	73·3	72·9	73
Difference...		+ 0·007	+ 1·3	+ 1·0	+ 4·6	+ 0·1	+ 1·0	—0·7	+ 1·0	0

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
0·13	50	69	19	14	77	Overcast: rain about 1 P. M.
—	46	86	19	19	50	Light clouds.
—	74	78	21	12	83	Overcast.
2·30	55	49	24	19	97	Rain until sunrise.
0 14	64	49	20	19	73	Cloudy; shower about 6 A. M.
—	53	78	22	19	87	Overcast.
—	54	53	21	21	97	do.
0 02	87	111	21	21	90	do.
0·01	110	84	22	23	97	Overcast: shower about 9¼ P. M.
0·26	88	59	22	21	93	Overcast: rain after 8½ P. M.
0 90	53	69	20	18	100	Overcast: drizzle till sunrise; heavy rain about 4 P. M.
—	95	54	20	17	80	Chiefly overcast.
—	58	112	20	17	80	Cloudy.
0·02	65	95	19	18	47	Light clouds: shower about 7¼ P. M.
0·04	65	82	20	23	60	Cloudy: shower about 7¼ P. M.
3·82	143 per day.		S W		81	
2.08	144 per day.		S W by S		72	
+ 1·74	— 1		1 Point W		+9	
—	62	93	19	18	73	Chiefly overcast.
—	78	103	21	21	93	Overcast.
0·01	94	80	19	19	80	Nearly overcast.
—	79	119	20	17	47	Light clouds.
—	81	76	21	15	53	Cloudy.
0·02	77	81	18	15	47	Light clouds: shower at 7 P. M.
0·56	111	61	20	15	40	Rain before 4 A. M.: nearly fine after.
—	99	88	20	16	23	Fine.
0·01	77	119	21	14	23	Nearly fine: light shower before sunrise.
—	85	75	20	16	30	Nearly fine.
0·06	84	78	19	15	47	Cloudy: shower at 1¾ A. M.
—	77	77	20	13	27	Light clouds.
—	70	73	21	14	60	Passing clouds.
0·03	75	100	21	12	50	Cloudy: shower at 11¼ P. M.
—	82	113	22	18	57	Cloudy.
0·05	80	87	24	13	60	Cloudy: rain at 3¾ P. M.
0·74	171 per day.		S W by S		51	
1·78	151 per day.		S W		71	
— 1·04	+ 20		1 Point S		—20	

1862.	Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.	
				Shade.		Sun.	Grass.		
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.
	Inches.	°	°	°	°	°	°	°	Per ct.
September; first half. 1	29·777	84·2	76·9	92·3	76·6	109·5	73·2	74·0	72
2	29·749	85·5	76·9	94·2	78·4	120·7	74·2	73·4	68
3	29·761	83·4	75·7	89·7	78·4	99·5	74·0	72·5	71
4	29·727	84·5	76·8	93·2	79·6	105·5	76·4	73·7	71
5	29·747	83·6	77·4	96·0	77·8	112·3	74·0	75·0	76
6	29·763	83·6	76·8	89·9	77·4	114·5	73·4	74·0	74
7	29·766	84·3	78·0	90·5	77·1	113·5	74·0	75·6	76
8	29·764	84·8	78·8	90·3	81·1	109·5	77·0	76·5	77
9	29·718	85·5	78·5	91·9	78·6	112·0	75·2	75·8	74
10	29·694	85·8	78·3	93·4	79·6	114·5	77·0	75·4	72
11	29·690	84·4	79·0	91·6	77·6	115·5	75·5	77·0	79
12	29·707	85·6	78·5	92·5	77·6	114·3	74·0	75·0	68
13	29·706	83·2	78·3	92·2	78·6	116·5	73·8	76·4	80
14	29·692	78·5	76·4	87·1	78·4	92·5	75·5	75·6	91
15	29·668	82·6	77·3	90·9	76·6	109·5	74·1	75·2	79
Mean.........	29·729	84·0	77·6	91·7	78·2	110·7	74·8	75·2	75
Average.....	29·763	82·9	75·7	90·5	77·8	—	74·1	72·7	72
Difference...	— 0·034	+ 1·1	+ 1·9	+ 1·2	+ 0·4	—	+ 0·7	+ 2·5	+ 3
September; second half. 16	29·712	84·5	77·9	94·0	77·1	109·5	74·7	75·3	75
17	29·765	85·4	77·9	92·9	77·6	113·7	74·2	75·0	72
18	29·785	85·1	77·5	94·6	78·7	112·6	76·0	74·5	71
19	29·786	82·0	76·7	95·5	77·7	113·5	76·8	74·6	79
20	29·830	79·3	76·0	84·2	76·8	90·9	74·0	75·0	86
21	29·879	77·8	75·0	83·9	76·6	97·7	75·0	73·8	88
22	29·899	77·3	75·1	83·2	74·8	95·7	73·0	74·2	90
23	29·843	79·7	76·4	90·9	74·3	106·0	73·2	75·1	86
24	29·769	82·7	76·5	90·9	75·8	100·8	73·8	74·0	76
25	29·726	80·1	76·3	85·6	76·6	93·5	75·0	74·7	85
26	29·687	81·3	76·8	88·0	72·8	98·5	72·0	75·0	82
27	29·669	83·1	75·8	89·5	77·8	99·3	75·2	72·8	72
28	29·671	83·3	76·6	89·8	76·8	99·5	74·8	73·9	74
29	29·738	83·7	78·4	91·5	76·8	109·5	74·5	76·4	79
30	29·783	82·6	77·9	90·7	75·2	106·5	73·3	76·1	81
Mean.........	29·769	81·9	76·7	89·7	76·4	103·1	74·4	74·6	80
Average.....	29·796	82·2	76·1	89·1	77·1	104·8	74·0	73·6	76
Difference...	— 0·027	— 0·3	+ 0·6	+ 0·6	— 0·7	— 1·7	+ 0·4	+ 1·0	+ 4

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	86	64	22	14	60	Cloudy.
—	60	81	24	13	57	do.
—	54	42	23	23	100	Overcast.
—	41	68	19	19	93	do.
—	79	63	21	14	67	Passing clouds.
0·57	37	67	19	11	32	Light clouds : rain at 2 A. M.
—	39	90	16	12	20	Nearly fine.
—	38	87	15	13	45	Hazy.
—	28	91	16	10	15	Fine.
—	49	89	20	10	23	Nearly fine.
0·04	32	70	18	9	27	Light clouds : shower about 5 A. M.
—	20	59	13	20	53	Cloudy.
0·02	28	50	18	16	83	Dull and oppressive : showery about noon.
0·21	35	29	16	23	100	Overcast : showers between 9 A. M. & 3 P. M.
—	58	50	21	17	70	Dull and heavy.
0·84	113 per day.		S by W		56	
2·08	133 per day.		S W by S		68	
— 1·24	— 21		2 Points S		—12	
—	52	102	20	16	77	Chiefly overcast.
—	53	103	17	14	57	Cloudy.
—	62	101	19	13	68	do.
0·74	90	84	18	18	88	Overcast : rain at 3½ & 8 P. M.
0·12	19	39	16	14	98	Overcast : showery.
0·22	22	31	15	8	90	Overcast between 5½ and 10 A. M.
0·84	27	30	15	16	75	Overcast : heavy rain about mid-day.
0·13	44	59	20	17	60	Cloudy : rain at 4½ P. M.
—	82	58	22	23	75	Cloudy.
0·22	41	53	22	28	93	Overcast : rain after 11¾ P. M.
0·16	77	59	23	24	98	Overcast : rain before 2 A. M.
—	82	65	22	21	93	Overcast.
0·01	92	84	20	18	90	Chiefly overcast : fall about 8 P. M.
—	81	107	18	15	40	Cloudy day : fine night.
0·32	71	40	19	14	17	Nearly fine : shower directly after mid-night.
2·76	127 per day.		S S W		75	
2·20	126 per day.		S S W		62	
+ 0·56	+ 1		None		+13	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.	
					Shade.		Sun.	Grass.	Dew Point.	Humidity.
			Dry.	Wet.	Max.	Min.	Max.	Min.		
		Inches.	°	°	°	°	°	°	°	Per ct.
October ; first half.	1	29·787	82·3	76·0	91·8	77·6	114·2	75·0	73·4	75
	2	29·773	84·0	78·2	90·7	77·6	115·5	73·8	76 0	78
	3	29·795	84·4	78 0	92·2	78·3	109·0	75·5	75 6	76
	4	29·800	82·7	78·7	91·5	77·1	106·5	75·6	77·2	80
	5	29·787	78·0	76·0	87 1	73 8	97·5	71·8	75·2	91
	6	29·755	82 5	78 4	91·5	76 2	110·5	75·5	76·9	84
	7	29·787	82·8	78·4	92·1	76·8	112 7	74·0	76·6	82
	8	29·776	82·0	78·3	90·9	76·3	114·5	73·0	76·9	85
	9	29·743	81·8	78·4	88·5	78·8	115·5	76 0	77·1	86
	10	29·717	79·9	76·5	86·4	77·6	109·5	77·0	75·2	86
	11	29·716	81·1	76·9	87·1	75·1	111 5	73 8	75·3	83
	12	29·778	82·1	77·6	88·7	76·4	109·5	74·0	75·8	82
	13	29·827	82·9	77 0	88·3	78·4	107 5	76·0	74·6	77
	14	29·844	82·5	77·3	88·7	77·6	110·5	74·5	753·	79
	15	29.831	83·8	77·9	89·6	77·0	114·5	74·0	75·6	77
Mean........		29·781	82·2	77·6	89·7	77·0	110·6	74·6	75·8	81
Average.....		29·822	80·8	76·0	86·5	75·9	109·5	74·1	74·1	81
Difference...		— 0·041	+ 1·4	+ 1·6	+ 3·2	+ 1·1	+ 1·1	+ 0·5	+ 1·7	0
October ; second half.	16	29 845	83 0	77·7	90·2	77·4	114·3	74·0	75·7	79
	17	29·852	82·2	77·4	88 9	77 6	112·4	74 6	75·5	81
	18	29·832	81·6	76·9	88·6	77·1	107·3	74·2	75·0	81
	19	29·800	80 6	76·6	90·7	75·1	114·5	72·8	75·0	84
	20	29·772	81·2	75·6	89·6	76·1	114·5	73·2	73·3	78
	21	29·753	83 8	77·6	92·3	76·5	105·5	74·0	75·2	76
	22	29·765	83·4	77·0	94·4	77·6	111·4	75·0	74·5	75
	23	29·783	85·5	77·8	94·7	78·2	105·5	75·9	74·8	71
	24	29·802	85·3	76·7	93·7	77·6	108·0	75·1	73·2	68
	25	29·823	84·1	76·6	91·5	78·4	109·0	75·5	73·5	71
	26	29·867	80·5	77·5	89·7	78·0	—	75·3	76·3	88
	27	29·861	81·0	76 9	87·2	76·6	111·0	74·1	75·3	84
	28	29·889	81·2	74 9	87·5	75 6	112·7	72·9	72·2	75
	29	29·894	81·0	74·3	87·3	74·8	106·5	70 8	71·4	73
	30	29·850	75·4	73·3	78·9	72·4	—	71·0	72·4	91
	31	29·830	72 6	72·5	78·7	71·8	—	71.0	72·4	100
Mean...		29·826	81·4	76·2	89·0	76·3	—	73·7	74·1	80
Average.....		29·873	79·0	74·5	84·2	74·3	—	73·0	72·6	82
Difference ..		— 0·047	+ 2·4	+ 1·7	+ 4·8	+ 2·0	—	+ 0·7	+ 1·5	— 2

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	37	51	17	5	48	Light clouds.
—	37	68	15	12	7	Fine.
—	64	74	16	13	30	Chiefly fine.
—	49	41	19	4	82	Dull and cloudy.
1·23	44	45	20	20	100	Overcast : rain from 3 to 9 A. M.
—	64	31	18	14	33	Light clouds.
—	35	51	17	12	22	Fine.
—	53	26	20	16	32	Fine day : cloudy night.
0·01	42	29	26	3	83	Overcast.
0·19	23	42	22	2	75	Cloudy : rain before 10 A. M.
—	22	48	31	7	30	Light clouds.
—	16	56	9	12	18	Nearly fine.
—	34	56	13	10	27	Fine with passing clouds.
—	23	47	10	9	23	Fine but hazy.
—	38	35	9	10	22	Hazy.
1·43	85 per day.		S S E		42	
5·08	105 per day.		S by E		58	
– 3·65	— 20		1 Point E		–16	
—	46	29	12	10	22	Light hazy clouds.
—	20	43	11	10	57	Cloudy.
—	15	43	14	9	85	Nearly overcast.
—	24	55	14	6	88	Overcast : shower at 3 A. M.
—	14	55	2	5	80	Dull and heavy.
—	85	84	20	16	70	Heavy passing clouds.
—	110	108	18	18	45	Cloudy.
—	90	83	19	18	65	Dull day : fine night.
—	73	47	21	0	40	Hazy clouds.
—	40	41	18	28	73	Nearly overcast.
1·66	31	25	24	12	83	Overcast : rain from noon till 1¼ P. M.
0·17	21	56	22	6	53	Flying clouds : rain about noon.
—	26	72	2	4	10	Nearly fine.
0·37	51	126	0	0	57	Hazy : rain after 10 P. M.
1·35	112	96	0	0	100	Steady rain for 13 hours.
3·22	83	57	0	21	100	Heavy rain from 0¾ to 9¼ A.M. and from 1¾ to 3¼ P.M.
6·77	116 per day.		S E by E		64	
7·87	112 per day.		E N E		58	
– 1·10	+4		15 Points		+6	

	1862.	Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced	
					Shade.		Sun.	Grass.		
			Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.
		Inches.	°	°	°	°	°	°	°	Per ct.
November; first half.	1	29·910	78·0	76·4	84·3	70·6	108·0	68·6	75·8	93
	2	29·944	78·4	75·3	84·0	73·6	107·5	73·0	74·0	87
	3	29 906	80·0	75·4	84·6	75·3	106·4	74·0	73·5	81
	4	29·898	80·3	75·6	85·3	75·2	107·5	73·6	73·7	81
	5	29·911	79·3	75·3	84·7	74·1	107·5	70·3	73·6	83
	6	29·901	79·4	74·8	84 5	74 6	106·2	71·6	72·9	81
	7	29 883	79·8	73 5	84 5	73·8	105·2	72·0	70 7	75
	8	29 895	78·8	70·8	83·5	74·9	104 5	72·3	66·9	68
	9	29·889	77·7	69·5	82·9	72·8	107·0	69·3	65·3	67
	10	29·890	75·8	68·6	81·8	68 6	104·0	63 2	64·8	70
	11	29·895	76 9	70 5	82·7	68·8	104·5	63·8	67·4	73
	12	29·913	77·6	73·0	83·3	71·8	100 3	67·7	70·9	81
	13	29·910	79·0	75·0	85 2	72 6	109 2	69 0	73·3	83
	14	29·888	79·9	73·8	83·8	75·8	104 2	73·0	71·1	76
	15	29·920	78·8	71·7	82·5	76·6	101·0	73·5	68 3	72
Mean......		29·904	78·6	73·3	83·8	73·3	105·5	70·3	71·0	78
Average.....		29·914	77·6	72·1	82·3	73·1	104·8	68·1	69·6	77
Difference..		– 0·010	+ 1·0	+ 1·2	+ 1·5	+ 0·2	+ 0·7	+ 2·2	+ 1·4	+ 1
November; second half.	16	29·924	78 0	71·7	83·3	71·6	103·6	68·2	68·7	74
	17	29·902	77·0	73·0	81·6	74 2	—	73·0	71·2	83
	18	29·883	78·0	73·2	81·4	73·6	—	72·6	71·1	80
	19	29·961	75·4	73·4	78·8	73·8	—	72·9	72·4	91
	20	29·996	76·4	72·4	80·9	73·6	—	72·1	70·6	83
	21	29·912	74·5	72·4	80·2	72·8	—	70·1	71 5	91
	22	29·854	76·8	75·5	84·6	72·1	105·5	67·9	75·0	95
	23	29·867	76·2	74·6	81·8	73·6	94·7	73 0	73·9	93
	24	29·902	75·7	74·0	78·9	73·8	—	72·1	73·3	92
	25	29·943	76·5	72·2	82·4	73·4	101·7	72·8	70·2	82
	26	29·945	77·1	71·9	81·1	70 6	100·6	65·5	69·5	78
	27	29·929	77·7	73·5	82·3	72·6	97·3	68·4	71·7	82
	28	29·932	77·2	73·2	83·4	73·0	101·2	68·5	71·5	83
	29	29·953	77·2	73·5	82·4	73·1	99·5	70·1	71·9	84
	30	29·941	78·0	73·8	83·7	73·6	102·5	70·0	72·0	82
Mean......		29·923	76·8	73·2	81·8	73·0	—	70·5	71·6	85
Average.....		29·950	76·2	71·1	81·1	71·7	—	695	68·7	78
Difference...		— 0·027	+ 0·6	+ 2·1	+ 0·7	+ 1·3	—	+ 1·0	+ 2·9	+ 7

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground.	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
0·08	25	52	7	6	40	Fine with passing clouds.
1·29	54	16	2	5	70	Rain from 1½ to 8 A. M & at 1 P. M.
0·11	52	73	31	2	37	Flying clouds: shower at 3 A. M.
—	46	77	1	3	18	Nearly fine.
—	43	73	2	2	22	Flying clouds.
0·01	45	97	1	3	37	do.
—	73	100	4	5	25	Light flying clouds.
—	69	84	4	4	23	Light haze.
—	37	82	2	3	12	Chiefly fine.
—	45	64	2	3	1	Fine.
—	49	70	2	1	13	Nearly fine.
0·08	60	77	31	2	50	Passing clouds: shower at 5½ A. M.
0·02	39	96	2	4	28	Chiefly fine.
—	79	109	4	3	45	Passing clouds.
—	89	109	3	2	38	do.
1·59	132 per day.		N E by N		31	
6·28	121 per day.		N N E		60	
— 4·69	+ 11		1 Point E		—29	
—	30	101	0	1	20	Light clouds.
0·07	77	85	1	1	92	Overcast: shower at 3 A. M.
0·13	76	94	0	2	100	Overcast: frequent showers.
1·12	62	43	2	1	100	Rain from 6 A. M. to 2½ P. M. also after [11 P. M.
0·09	57	79	29	0	90	Light showers.
0·11	74	82	29	29	92	Light showers: rain at 7 P. M.
0·12	100	36	0	6	77	Shower at 4½ A. M.
0·14	39	56	1	2	80	Rain from 1 to 2½ A. M.
2·13	30	58	3	2	92	Rain from 5½ A. M. to noon.
0·02	62	68	1	1	68	Passing clouds.
—	54	66	1	2	43	Hazy clouds.
—	49	85	3	3	80	Chiefly overcast.
—	50	90	2	2	77	Passing clouds.
—	62	77	3	3	78	do.
—	55	69	3	2	27	Hazy.
3·93	131 per day.		N by E		74	
5·52	133 per day.		N N E		55	
— 1·59	— 2		1 Point N		+19	

1862.		Mean Barometer reduced to 32° Faht.	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.	
					Shade.		Sun.	Grass.		
			Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.
		Inches.	°	°	°	°	°	°	°	Per ct.
December ; first half.	1	29·974	76·6	72·2	82·2	72·5	101·5	67·5	70·2	81
	2	29·991	78·5	72·6	82·7	71·8	103·2	66·0	69·9	75
	3	29·992	78·3	69·5	81·6	74·4	98·1	68·0	64·9	65
	4	29·985	77·5	71·4	81·7	72·6	99·5	67·0	68·5	75
	5	29·957	76·1	70·8	82·2	70·9	97·4	65·7	68·3	78
	6	29·933	75·6	70·9	80·2	71·1	92·6	66·3	68·6	80
	7	29·936	76·4	70·3	80·7	69·8	96·5	64·7	67·3	75
	8	29·959	75·8	69·9	81·6	71·4	98·5	63·4	66·9	75
	9	29·909	74·5	69·6	81·2	67·6	99·5	58·4	67·1	78
	10	29·893	75·7	72·5	79·9	67·7	96·2	60·7	71·1	86
	11	29·916	75·5	73·7	80·6	69·6	95·5	62·4	72·9	92
	12	29·879	76·1	74·5	81·0	71·6	94·5	66·0	73·8	93
	13	29·850	71·3	71·1	83·1	72·2	—	67·8	71·0	99
	14	29·836	74·1	72·2	79·9	71·8	—	66·8	71·3	91
	15	29·854	75·8	70·7	79·6	71·7	95·1	66·2	68·2	79
Mean……..		29·924	75·9	71·5	81·2	71·1	—	65·1	69·4	81
Average……		29·957	75·3	70·3	80·1	70·8	—	65·8	67·9	79
Difference…		− 0·033	+ 0·6	+ 1·2	+ 1·1	+ 0·3	—	− 0·7	+ 1·5	+2
December ; second half.	16	29·845	75·8	72·0	79·5	73·6	92·7	66·1	70·2	84
	17	29·824	71·9	70·3	75·0	69·1	—	64·4	69·5	93
	18	29·784	71·7	69·8	73·9	70·4	—	66·5	68·8	91
	19	29·778	69·3	64·1	72·1	67·1	—	61·8	61·0	76
	20	29·791	71·6	66·4	74·3	68·1	—	61·0	63·6	77
	21	29·798	73·0	71·3	77·2	70·5	87·4	63·1	70·5	92
	22	29·785	73·7	70·9	79·1	71·7	—	65·0	69·6	88
	23	29·810	74·0	71·8	76·5	71·6	—	67·0	70·8	90
	24	29·848	73·6	72·1	77·1	72·8	—	66·0	71·4	93
	25	29·879	76·6	74·6	78·3	72·5	80·5	68·0	73·8	91
	26	29·922	73·4	72·5	78·8	72·5	96·5	—	72·1	95
	27	29·964	72·4	70·8	73·6	71·5	—	71·3	70·0	94
	28	29·997	74·3	71·8	79·5	71·8	96·7	71·3	70·6	89
	29	30·013	72·7	68·9	78·2	68·3	95·0	65·9	66·9	83
	30	30·055	70·5	67·4	77·4	65·4	95·5	61·6	65·8	86
	31	30·050	69·8	66·6	77·7	62·6	100·0	56·9	64·9	85
Mean……..		29·884	72·8	70·1	76·8	70·0	—	65·1	68·8	88
Average…..		29·996	74·5	68·8	79·5	69·5	—	63·8	65·9	76
Difference…		− 0·112	− 1·7	+ 1·3	− 2·7	+ 0·5	—	+ 1·3	+ 2·9	+12

Rain.	Wind.				Per centage of clouds.	Weather.
Five feet from ground	Velocity.		Direction.			
	A. M.	P. M.	A. M.	P. M.		
Inches.	Miles.	Miles.	Points.	Points.		
—	43	58	2	3	23	Fine with passing clouds.
—	49	78	3	3	27	do. do.
—	110	122	3	3	30	Hazy clouds: lunar halo.
—	99	115	2	2	62	Hazy clouds: colored do. at 10 P. M.
—	83	97	0	1	63	Passing clouds: lunar halo.
—	74	98	1	1	82	Dull and heavy.
—	76	126	31	3	37	Flying clouds.
—	94	90	3	1	33	Light hazy clouds.
—	52	85	0	1	30	Passing clouds.
—	60	94	31	0	25	Hazy clouds.
—	74	112	0	1	68	Heavy clouds.
0 04	90	128	0	1	95	Overcast: rain at mid-night.
1·36	86	67	30	30	100	Rain—chiefly before noon.
3·28	91	94	31	0	100	Heavy rain.
0·01	84	106	31	0	97	Overcast.
4·69	176 per day.		N by E		58	
3 98	141 per day.		N N E		55	
+ 0·71	+ 35		1 Point N		+ 3	
—	98	139	0	31	93	Overcast.
0·29	130	111	30	31	100	Do. rain $7\frac{1}{2}$ A. M. & $3\frac{1}{2}$ P. M.
0.63	110	112	31	30	100	Do. rain chiefly before noon.
0·03	117	112	29	30	100	Do. shower at $2\frac{1}{2}$ P. M.
—	118	126	30	31	100	Do.
0·09	129	142	31	0	97	Showery and overcast.
0·02	118	129	0	0	87	Chiefly overcast: shower at $11\frac{3}{4}$ P. M.
0·18	108	79	0	0	100	Showery and overcast.
0·17	121	87	31	0	100	Overcast: rain at 10 A. M.
—	100	88	2	3	100	Overcast.
0·39	55	95	0	0	98	Do. rain from $1\frac{1}{2}$ to $8\frac{1}{2}$ A. M.
0·49	91	88	0	1	97	Do. rain between $3\frac{1}{2}$ & 11 A. M.
0·02	67	91	1	0	70	Clouds breaking: fine night.
—	75	94	0	2	35	Light passing clouds.
—	62	58	0	1	27	Chiefly fine.
—	26	49	2	3	3	Fine.
2·31	195 per day.		N		82	
2·33	153 per day.		N N E		50	
—0·02	+ 42		2 Points N		+32	

The mean atmospheric pressure throughout the whole year was 29·830 inches;—0·014 less than the average of twenty years. The highest reduced readings were 30·018 on February 12th, and 30·123 on December 31st:—the lowest was 29·508 on June 29th.

The greatest degree of heat registered in the shade, was 107°·1, on May 30th: in full sunshine, three feet from the ground, 124°·5 on May 17th. The lowest temperatures were recorded on February 27th and December 31st, on which days the shade minimum went down to 63°·5 and 62°·6, and the grass thermometer to 58°·3 and 56°·9 respectively. The mean annual temperature was 81·3, or 0·7 above average. That of evaporation, as shewn by the wet bulb thermometer, was 74·9, or 0·9 above average. The mean daily range for the year was 14°·5.

The dryest day in the year was June 12th, when the percentage of humidity fell so low as 42, and the mean dew point was 63°·1, or 27°·4 less than the mean temperature of the day. Complete saturation of the atmosphere occurred but once, viz., on October 31st.

Rain fell on 96 days. The quantity measured was above one inch on 113 days, but the greatest fall was only 3·28 inches, on December 14th. The total fall during the year was only 38·18 inches, leaving a deficiency of 12·57 inches or exactly one-fourth of the whole yearly average.

The mean daily velocity of the wind was 151 miles, from S E by S. It was recorded half daily, and ranged between 165 miles on May 22nd P. M., and 14 miles on October 20th A. M. It is worthy of remark, that, although the wind at Madras is insignificant in comparison of that in England, it is far more constant, and rarely ever quite still. Not one single half day has been perfectly calm since the velocity gauge was first put up, on September 1st 1861. During the steadier months of the year, the resultant velocity, or that in which the force from each point of the compass is taken into account, often nearly equals the mean velocity, and rarely falls short of three-fourths of the latter quantity. In the two variable periods however, the difference is very considerable. Thus, in the latter half of March, while the actual daily wind was 125 miles, from N N E, the resultant value was only 40 miles, from East; but in the latter half of October, when the daily motion was 116 miles from S E, the resultant value was only 3 miles per day, from S S W. This remarkable effect of contrary winds must surely have considerable influence upon the public health and mortality returns; since any miasmatic vapors existing in the atmosphere at the time, though stirred up and diffused by the actual daily wind, will still be blown backwards and forwards, so as to continue hanging about, or at least only very slowly receding from, the same spot; while at other times they would be wafted a thousand miles off in less than a single week. The number of half days the wind blew from each point of the compass is given in the following table:—

North..........	31	East..............	14	South	47	West.............	5
N by E	28	E by S..........	13	S by W........	36	W by N.........	1
N N E	30	E S E..........	17	S S W.........	41	W N W	4
N E by N......	42	S E by E	14	S W by S......	42	N W by W....	1
North East....	16	South East....	21	South West...	32	North West....	2
N E by E......	32	S E by E..	33	S W by W....	32	N W by N.....	4
E N E...	21	S S E	60	W S W	19	N N W	9
E by N.........	13	S by E.........	44	W by S.........	11	N by W.........	15
From N E Quarter	213.	From S E Quarter	216.	From S W Quarter	260.	From N W Quarter	41.

NORMAN ROBERT POGSON,
Government Astronomer.

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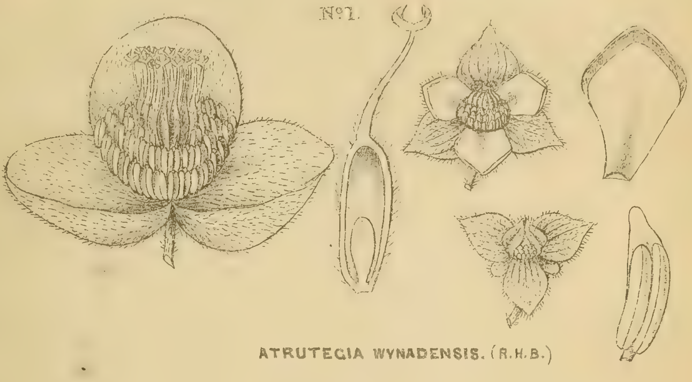

ATRUTEGIA WYNADENSIS. (R.H.B.)

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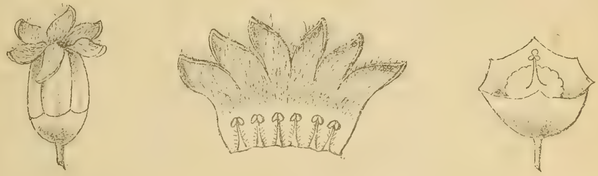

ANACOLOSA DENSIFLORA. (R.H.B.)

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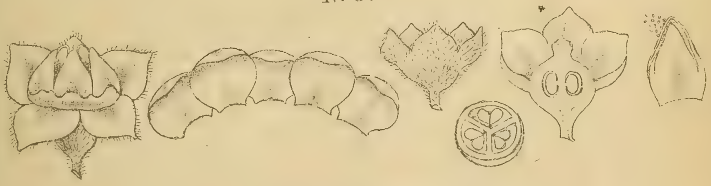
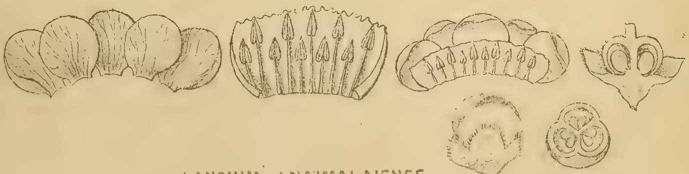


BEDDOMEA SARMENTOSA. (HOOK. FIL.)

Nº 4.

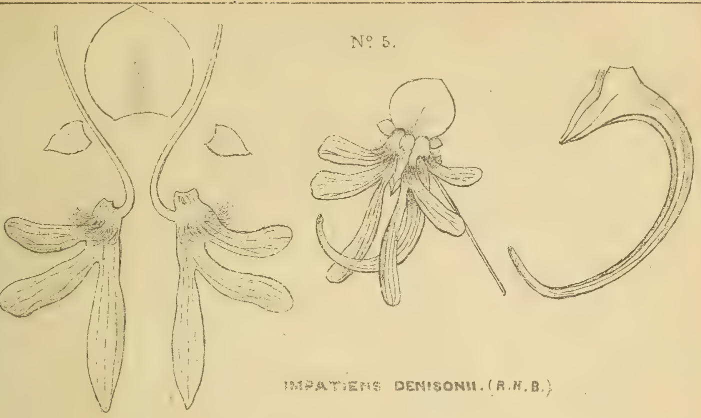


LANSIUM ANAIMALAIENSE.
(R.H.B.)

A. Barren, Lithogr. Madras

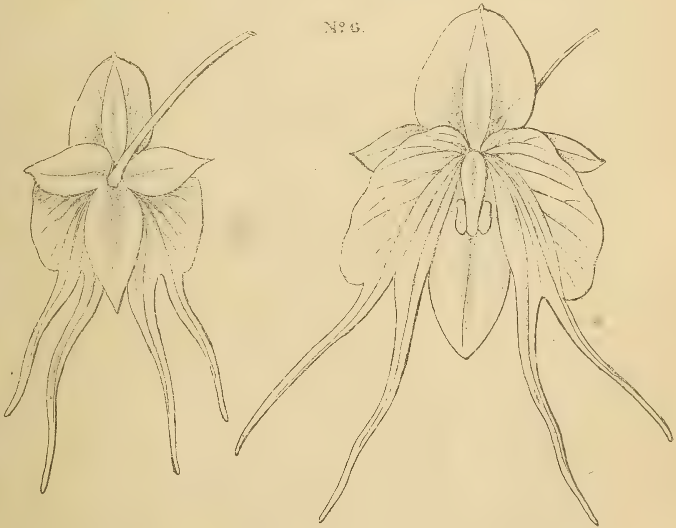
NATURAL HISTO

No. 5.



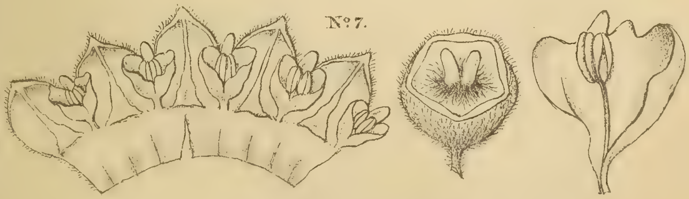
IMPATIENS DENISONII. (R.H.B.)

No. 6.



IMPATIENS ORCHIOIDES. (R.H.B.)

No. 7.

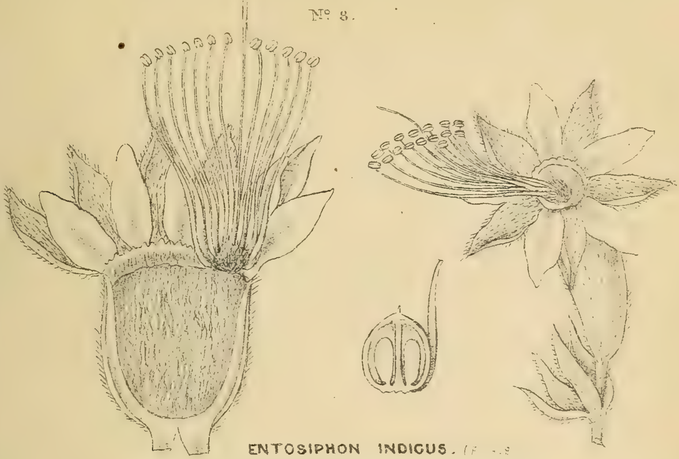


ZIZYPHUS WYNADENSIS. (R.H.B.)

A. Barren, Lithogr. Madras

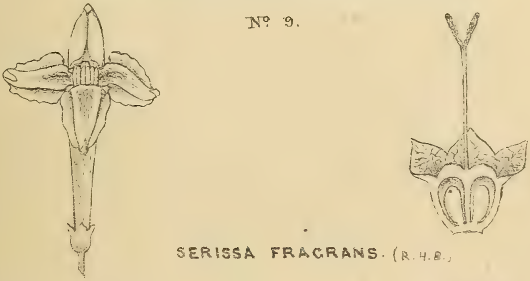
BRITISH MUSEUM

Nº 8.



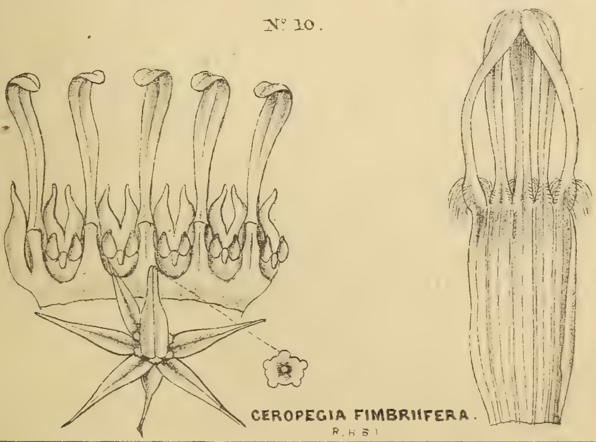
ENTOSIPHON INDICUS. (F [illegible]

Nº 9.



SERISSA FRAGRANS. (R. 4. 8.)

Nº 10.



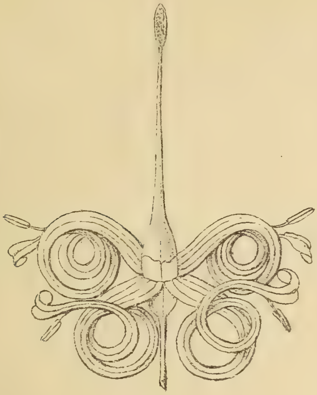
CEROPEGIA FIMBRIIFERA.

R. H 51

A. Barren, Lithogr. Madras.

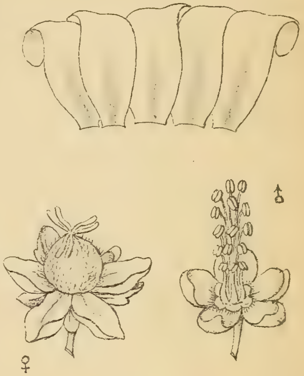
BRITISH MUSEUM
NATURAL HISTORY

No. 11.



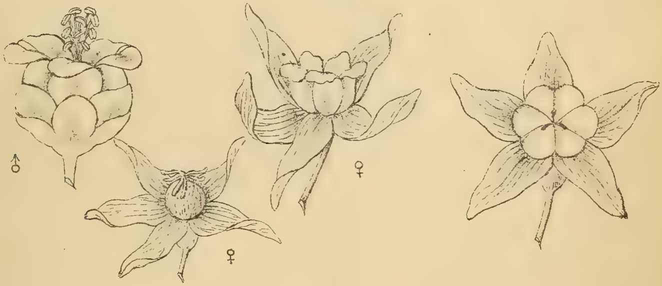
HELICIA NILAGIRICA
(R. H. B.)

No. 12.



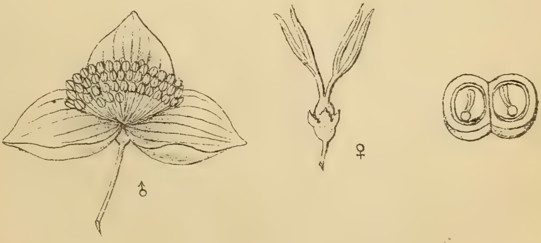
DESMOSTEMON ZEYLANICUS.
(THWAITES.)

No. 13.



DIMORPHOCALYX GLABELLUS. (THWAITES.)

No. 14.

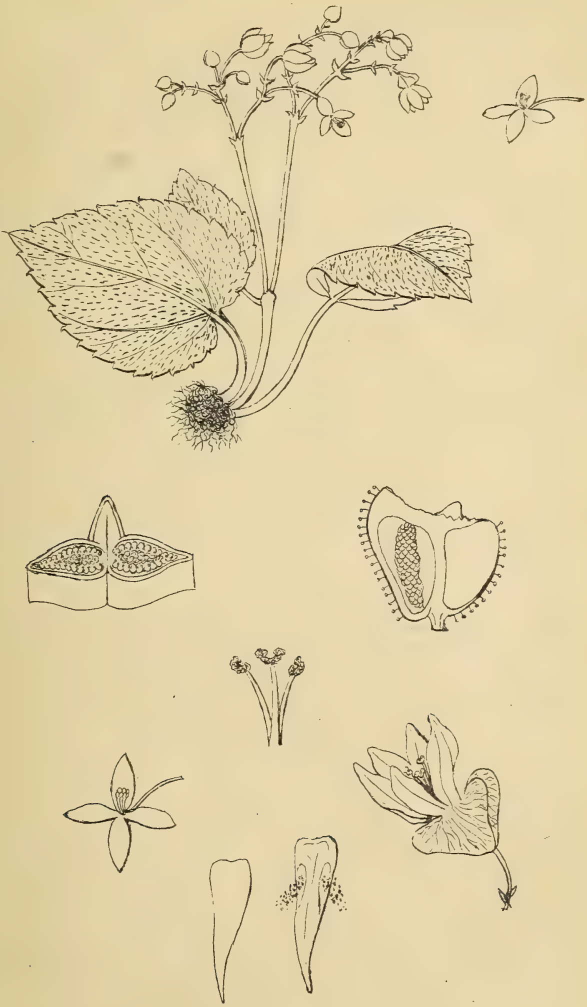


CLEIDION JAVANICUM. (BLUME.)

A Barren, Lithogr. Madras

BRITISH MUSEUM NATURAL HISTORY

No. 15.



BEGONIA (D) MINIMA. (R. H. B.)

A. Barren, Lithogr., Madras.

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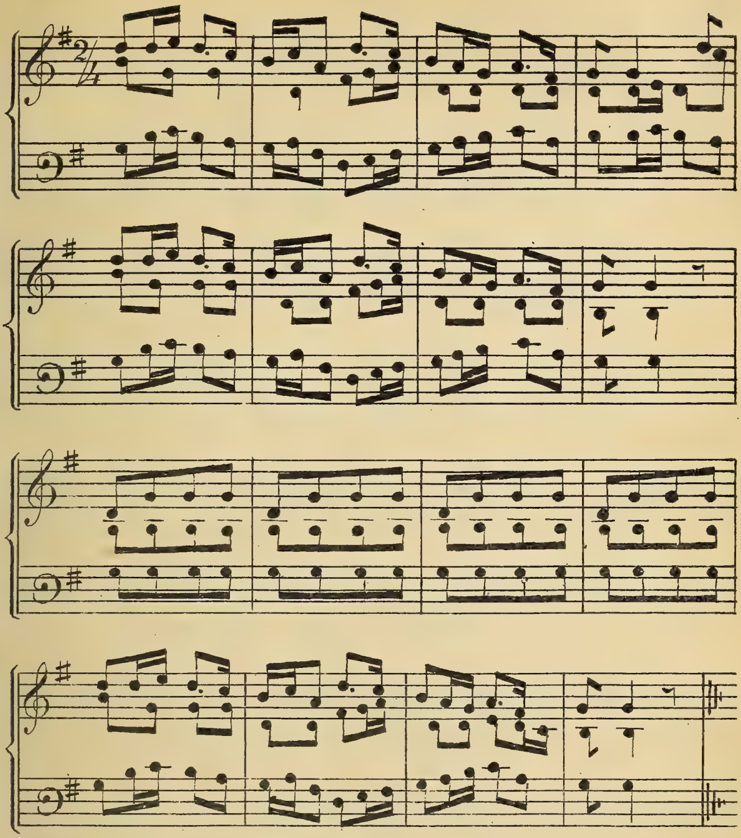
Nº 1.



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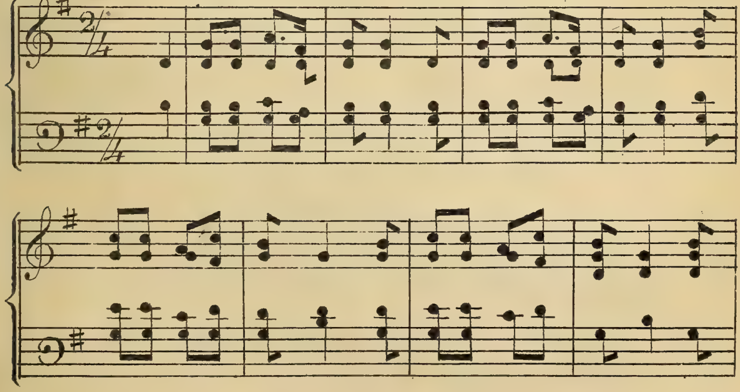

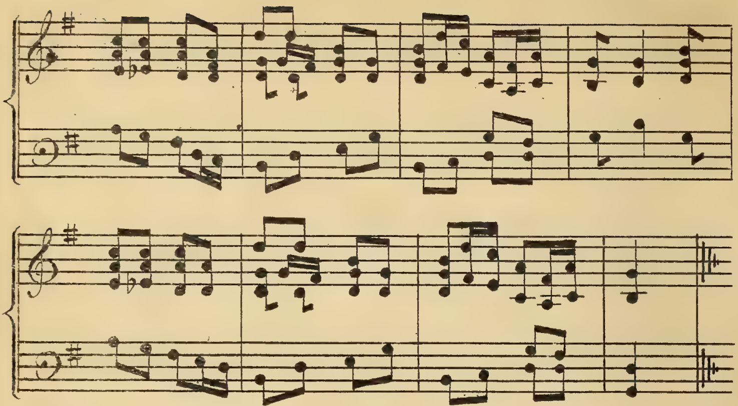

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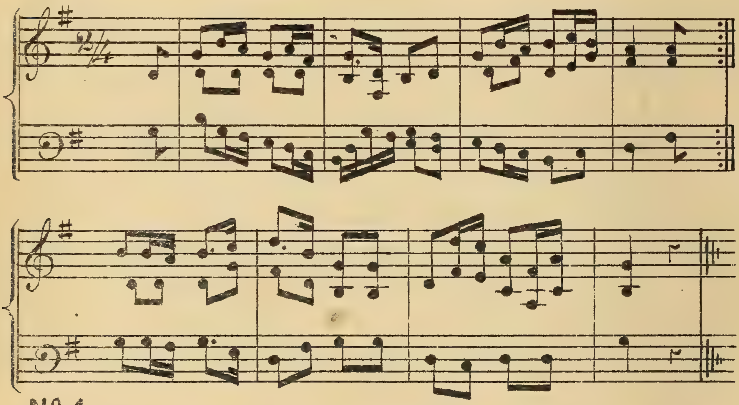

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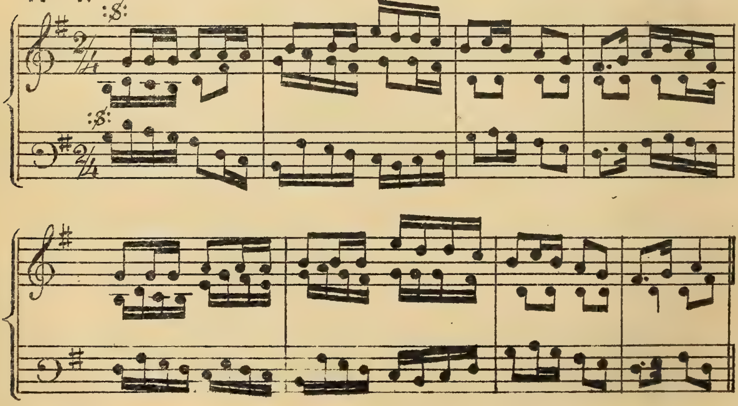

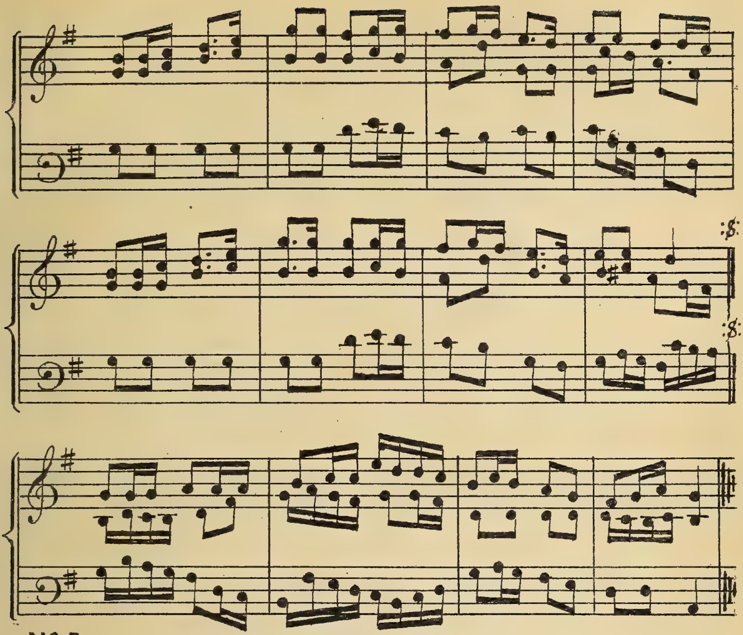

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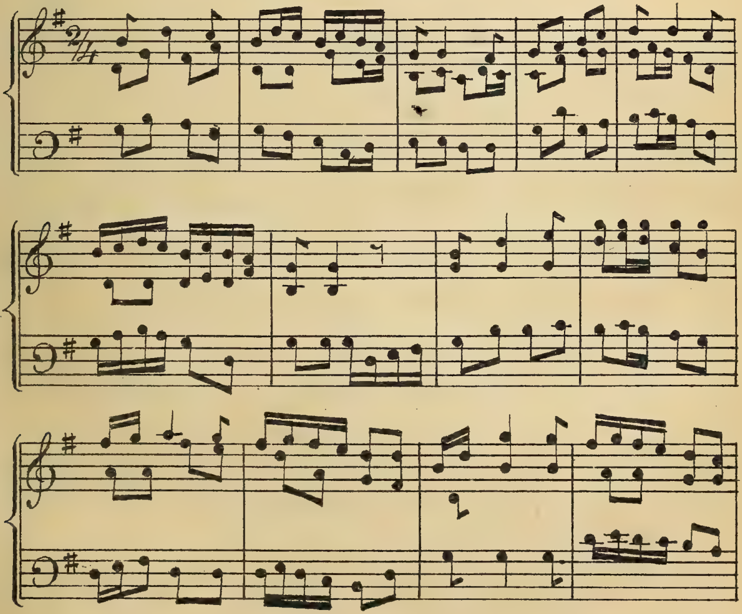

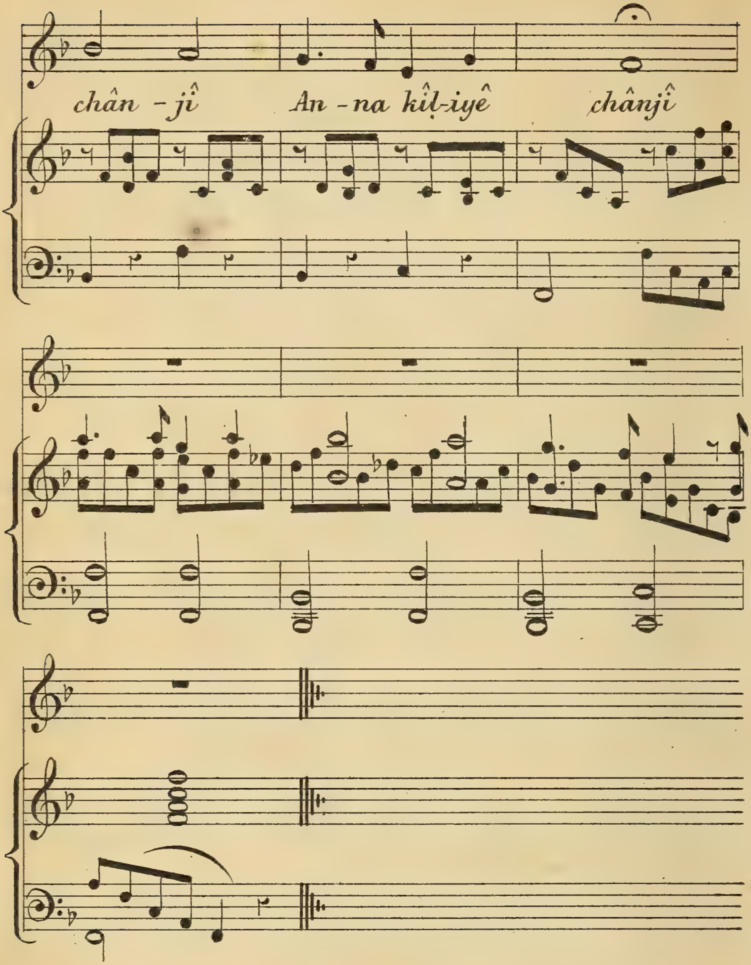
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An - na kîḷ-iyê
chânjî

THE

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OF

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ERRATA.

Page 44, line 20, for Cadanul read Candanul.

" 47, lines 24, and 26, for Vira Siva read Vira Saiva.

" 56, line 28, for సగ్గు read సిగ్గు.

" 57, line 24, for Gati read Giti.

" 58, line 5, for గుర్రము read గురము.

On the occurrence of Stone Implements in lateritic formations in various parts of the Madras and North Arcot Districts. By R. BRUCE FOOTE, *Geological Survey of India.*

THE discovery that certain of the more recent formations in Southern India contain Stone Implements of undoubtedly human manufacture and of the same type precisely as the flint weapons now creating so much interest in various parts of Europe, cannot fail to excite some attention among Students of Geology, Ethnology and Archæology. With the exception of a brief verbal notice of the discovery of these Implements made to the Bengal Asiatic Society at their general meeting in December last by Dr. Oldham, the Superintendent of the Geological Survey of India, no account of them has yet been made public(1).

Excepting a doubtful fragment of a Stone Implement found by Mr. Theobald of the Geological Survey of India in the Gangetic alluvium near the mouth of the Soane, no traces of chipped Stone Implements had previously been discovered in India.

Until the discovery of these evidences of the existence of man during or prior to the formation of these deposits, nothing more was known of their geological age than that some formations supposed to be identical with them rested unconformably on the cretaceous rocks of the Trichinopoly and South Arcot Districts and were themselves overlaid by the alluvium of the Cauvery, Vellaur and Punniaur rivers.

The discovery however of articles of indubitably human manufacture at once fixes the position of these formations very nearly at the highest point of the geological scale by

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(1.) NOTE.—See Journal of Asiatic Society of Bengal, No. CCXCIII. 1864, p. 67.

including them within the group of Quarternary or possibly even Recent deposits(1).

These implement-bearing-formations so far as they have hitherto been examined in the Madras and North Arcot Districts are found resting either on the older metamorphic rocks of the country, the Gneissic series, or more generally on a series of formations probably of greater geological antiquity than the Cretaceous system. These formations provisionally termed the Stri Permatoor series, because of their having been first studied near the town of that name contain vegetable remains which appear to be identical in species with some discovered in the Rajmahal hills in Bengal and also in Cutch. These latter fossil plants are thought to have affinities to, even if they be not absolutely identical with certain forms occurring in the Jurassic formations of Europe.

All the Implements that I have seen hitherto, amounting to several hundreds, are made of quartzite—which is a metamorphosed sandstone, generally semi-vitreous in texture, very hard and tough, and, on the whole the best substitute for flint in this part of India.

The first Implement discovered was found by me on the 30th May last year, among the debris thrown out of a small gravel pit a few hundred yards north of the Cantonment at Palaveram (10 miles S. W. of Madras) and about the same distance west from the high-road. My acquaintance with the flint Implements which have excited so much interest in Europe was at that time limited to figures of them given in "The Geologist," and I was then but little familiar with peculiarities of fracture of quartzite pebbles. I felt a little doubtful therefore in unhesitatingly regarding my find as a genuine Stone Implement, so contented myself

(1.) NOTE.—The term Recent deposits is intended to embrace all in which the included organisms are of living species.

with mentioning it in a letter to my friend and colleague Mr. King and showing it to different members of my family.

As I was leaving Palaveram the very evening I found the Implement, I could not at the time extend my researches for further specimens, but a careful search made in January last put me in possession of two further Implements of much more perfect shape than the first.

The figure and description of this first Implement will be found further on.

Although my attention had been thus awakened, and I kept carefully looking out for Implements in other places where the lateritic gravels contained pebbles or fragments of quartzite, I did not meet with any more for several months.

On the 28th September last, my colleague Mr. King, who had accompanied me to see some sections of the plant-bearing-shales (of the Stri Permatoor series) in the Atrampakkum nullah(1) (a tributary of the Cortelliar) picked up two well-shaped oval Implements on a little terrace of quartzite shingle in the bed of the stream.

The true nature of these Implements was so unmistakeable, that we immediately commenced searching for more, and in a few minutes were well rewarded, by finding several others as we walked up the dry bed of the nullah.

The condition of the Implements found showing evidently that they came from somewhere near at hand, we resolved to search the banks of the nullah very closely in order if possible to discover other Implements *in situ*.

The following day we proceeded to examine the nullah and its tributary gullies, commencing where the lateritic gravel first becomes well exposed on the west side of the old ruined pagoda at the northern end of the Numbaucum tank. It was not long before we found several finely shaped quartzite Implements *in situ,* imbedded with numerous quartzite pebbles in a bed of hard ferruginous laterite conglomerate which there rests unconformably on the plant shales.

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(1) Note.—By some mistake this village is called Nirumpauk on the Atlas sheet No. 78. All the places named will be found on that Map on which the general features of the country are also well laid down.

The Implements *in situ* were found at depths below the surface varying from three to eight or ten feet, and often so tightly impacted as to necessitate some little labour with the hammer to extract them uninjured.

Since the discovery of the Quartzite Implements at Palaveram and in the Atrampakkam nullah, they have been met with and collected at numerous other places in the Madras and North Arcot Districts. The list of such places given in the Appendix shows the wide distribution of the Implement bearing gravels, since the deposition of which the geological features of this part of the Carnatic have undergone material alterations. The names of the persons by whom the Implements were first collected are also given in the Appendix.

Geological features of the Implement bearing formations.

The circumstances under which the Implements are found occurring now demand some attention, as the formations they have been found in do not appear all to belong to the same series. They have been found in typical unaltered laterite conglomerates of uncertain age, but very probably younger than the typical laterite, and in lateritic gravels and sands.

The first Implement discovered was derived from the lateritic gravel at Palaveram, which occurs on the north side of the Cantonment in a thin bed resting on the gneiss. South West of the Cantonment and also on the south side of the brigade ground at St. Thomas's Mount, where the surface has been less eroded, the bed may be seen in numerous ballast pits to have a thickness of 2-3 feet and occasionally to assume the true conglomerate character. This laterite must be considered as an outlier of the more extensive spreads occurring south of the great Chembrumbaucum tank near Poonamallee.

The Implements discovered in such large numbers north of Trivellore in the Atrumpakkam nullah valley are derived from beds of lateritic conglomerate which are probably younger than the typical laterite occupying extensive tracts of higher ground in the immediate neighbourhood.

These higher lying laterite conglomerate beds however themselves yield numerous specimens of worked stones identical in type with those from the low level conglomerates· The reasons for regarding the latter as of later date will be considered further on.

Finally, Implements have been obtained from sandy quartzite gravel and shingle beds between Stripermatoor and Conjeveram, but none have been found *in situ* in those deposits.

The discovery of Implements in various localities and formations in North Arcot District was made by my colleague Mr. King, whose description of them will be found appended to this paper.

The most instructive sections shewing the relation of the low level Implement-bearing-conglomerates, occur in the banks of the Atrampakkam nullah and of the various gullies connected with it, several of which were formed by the bursting of the large Numbaucum tank.

Immediately below the old ruined pagoda already referred to is a capital section cut by a gully formed through the bursting of the tank. The Implement-conglomerate as here shown, lies only a couple of hundred yards west of where Implements were discovered *in situ.*

The sequence of beds here shown is the following:—

a. Soil and made ground 6'.

b. Lateritic conglomerate with layers of quartzite pebbles 1½'—3'.

c. Sandy clay with quartzite pebbles and kunkur in strings 5½'—6½'.

d. Lateritic conglomerate full of quartzite pebbles 3'.

e. Grey shales (plant shales) with ferruginous stains 1' 8".

A few yards to the west of the pagoda a shallow gully exposes these beds as far as the top of lateritic conglomerate bed "d," and here I found a good hatchet shaped Implement sticking out of the overlying sandy clay "c"—a few inches above the junction of the two strata. This Implement was apparently *in situ,*—about 10 or 11 feet below the true surface. The first Implement found unequivocally *in situ,* was disinterred by Mr. King from a bed of lateritic conglomerate exposed to the east of the tank in another deep gully formed by the escape of the surplus water over the kalingula, aided by another bursting of the bund between the kalingula and the pagoda.

A few yards from the spot where the Implement was found, the vertical left bank is seen to consist of the following beds.

a. Soil 2'—3'.

b. Clay with laterite pebbles and a little kunkur 3.' 6"—4'.

c. Pebbly laterite conglomerate 1'.

d. Kunkurry clay—7'.

The Implement was imbedded in bed "c."

Fifteen or twenty yards further down the gully, I came upon a large hatchet shaped Implement (Plate XII) lying *in situ* on the here exposed top surface of the bed *c*, fully six feet below the general surface.

The banks of this gully and its tributaries show in several places two distinct beds of lateritic conglomerate divided by sandy clay corresponding with the bed *c* of the pagoda gully section—in other places the sandy clay is absent and but one bed of laterite seen.

About ½ a mile eastward of the spot where the above two Implements were met with, and a little below the junction of the Kalingula gully with the main stream—another section is formed by a small gully running northward.

The beds seen in this section are :—

a. Vegetable soil 2''—3''.

a'. Loamy sand 10''.

b. Lateritic gravel 9''.

c. Clayey sand with much kunkur and a few pebbles of kunkur and laterite 1'—4''.

d. Lateritic conglomerates with Implements.

e. Plant shales with kunkur infilteration 1'—1''.

On the face of the bed *e* at this place a large, and rather water-worn implement was well exposed, but the non-exposed part was so firmly impacted in the conglomerate as to require several blows from a rather heavy hammer to detach it. A few yards to the north two other Implements were extracted from the same bed in which they were also firmly imbedded.

A gradual thinning out eastward of the lateritic deposits from the pagoda gully section can be distinctly traced, and there is no good reason to doubt the identity of the beds *b*, *c* and *d* of the above section with the corresponding beds in the pagoda gully section.

A small excavation was made in this gully, and about half a cubic yard of the lateritic conglomerate (*d*) thrown down, and found to contain several Implements of small size and not very good shape. Although the conglomerate looked rather friable, it was found to be very tough and compact, and it took a long time to break it down, though a strong man was set to it armed with a heavy English pickaxe.

From the side of a little gully tributary to a stream falling into the Atrampakkam nullah from the north, and at a spot about ½ a mile E. of Nelway village, a very fine Implement (Plate VI) was extracted with no little trouble from a very hard bed of lateritic conglomerate. It was imbedded fully 3' below the top of the bed close to the bottom of the gully which does not cut through the conglomerate so as to reveal its whole thickness. On the high ground about a mile to the N. E. of this gully (which is immediately north of a lime kiln), several poor and partly broken specimens of Implements were found weathered out of the laterite rock and scattered over the surface a few hundred yards to the N. W. of a village of the name of Cunjalum, which is not shown on the Atlas sheet No. 78. Amongst these was a small one figured on Plate XIV, which is interesting as being the only specimen of an arrow-head hitherto met with. The very compact laterite rock on this high ground bears a striking resemblance to the typical rock at the Red Hills near Madras and at Capper's Hill near Cuddalore—at the former of which places unmistakeable Stone Implements have been discovered by Dr. Cornish of the Madras Medical Service.

The Cunjalum laterite contains many fewer quartzite pebbles and fragments than are found in the conglomerate beds exposed in the nullah—which might be regarded as an argument in favour of the two deposits being of different ages, were it not that about two miles N. W. an equally high level spread of conglomerate near Goompolliam, from which Implements were obtained, is quite as largely made up of pebbles as any part of the beds in the Atrampakkam nullah.

Unfortunately no section could be found to clear up the relation of the lateritic conglomerate in the valley of the Atrampakkam nullah to that on the top of this high ground E. of Nelway, and I am rather doubtful whether to consider them as part of one and the same series or to regard the lower lying beds as subsequently formed and mainly from the debris of the higher lying ones. Dr. Oldham and Mr. King inclined to think these low level beds younger than the typical laterite and derived from it, in fact a local alluvium.

It is not impossible that the laterite of the valley and the high ground in question might belong to one and the same formation, which accommodated itself to the greatly eroded surface of the plant-bearing series, a phenomenon which on a smaller scale, may be well observed in hundreds of places in the many sections occurring in this part of the country.

On a far larger scale is such a conformity of the laterite with the shape of the surface traceable in the valley of the Ingawarpolliam nullah 5 or 6 miles E. of Sattavedu, where the laterite passes down from the high ground, disappears under the local alluvium and re-appears again on the opposite side of the valley. A similar phenomenon is stated to be of common occurrence in the laterite of Bancoorah District in S. W. Bengal(1). This point must remain for

(1) Note.—See Report on the Geological Structure and Physical Features of the Districts of Bancoorah, Midnapore and Orissa. Bengal Memoirs—Geol. Survey of India—Vol. I, page 270.

future explorers to explain definitively by the discovery of better sections.

The typical laterite rocks of the Red Hills near Madras, which as already mentioned yielded Implements to the research of Dr. Cornish, can be regarded only as an outlier of the larger and more elevated laterite areas which lie between the Sattavedu and Alicoor hills and the Coast alluvium. I have myself lately had the pleasure of chiselling out several well shaped and well preserved Implements from the hard glazed-surfaced laterite rock occurring at the northern end of the Red Hills area and capping the line of cliffs which occurs along the Corteliar, north eastward of Yermootapolliam, and compels the river to diverge to the north for a distance of about one mile. No Implements appear to occur in the gritty beds underlying the laterite conformably, both here and in the Manjakarney outlier 1¾ miles to the N. W. The gritty beds are most probably identical with those underlying the Cappers Hill laterite and called " Cuddalore Sandstones" by Mr. Henry Blanford(1). Laterite of precisely the same mineral character and appearance occurs north of the Narnaveram river and may be seen resting on similar grits near Ingawarpolliam and Amerumbardoo(2). Besides these places typical laterite occurs at and around Maderapaucum, Cunnumbaucum, Boodoor and Caradepootoor

(1.) NOTE.—See Memoirs of the Geological Survey of India, Vol. IV., page 165.

(2.) NOTE.—Near this village are a great many so called " Corumbur rings." Some of which contain Kistvaens of quarried and rudely cut laterite blocks evidently derived from the immediate neighbourhood. Many others occur in the scrub-jungle to the north. From a small rain gully running west from this jungly ground opposite to Roshunnugger (or Roshunaveram as it is generally called,) I obtained half of a perforated black stone carefully rounded and smoothed. The stone when entire was probably of oval shape and evidently of human shaping and most likely came from one of the Kistvaens, most of which have been opened and plundered.

Further south near Arconum I met with a well made " Celt" lying on the surface very near to some half destroyed Corumbur rings which lie on the north side of the Corteliar opposite Tukkool (5 miles S. E. by E. of and various other places. At the six places named Implements have been extracted from the solid rock. Of these some were in very good condition, others considerably weathered. The latter seemed made of a less than usually compact variety of quartzite which has been most affected where the laterite acquired a glazed surface.

Many others also belonging to all the classes which are described further on were found scattered over the surface, having been weathered out of the laterite rock.

The formation in which the Implements occur at Kircumbaddy(1) in the Soornamookey valley is a bed of laterite with pebbles of quartzite resting on decayed gneiss.

I am indebted to Mr. W. R. Robinson, C. E. of the Madras Railway for the following section of the Kircumbaddy plain, and particulars of the occurrence of the Implements.

Laterite including a bed of pebbles……………………	4 feet.
Decayed gneiss……………	10 feet.
Gneiss………………………	

The Implements occur in the laterite at a depth of from 2½ to 3 feet below the surface which is the position of the pebble bed As in many other places further south, Imple-

Arconum Junction.) The "Celt" appeared from its position to have been swept down the slope from the Corumbur rings by heavy rains.

A couple of hundred yards eastward I picked up a good oval Implement of small size from among the debris of a bed of laterite conglomerate.

About a mile further N. E. lies a curious circular encampment with a double line of circumvallation thrown up on the side of the low hill—which is there capped with quartzite shingles derived from the weathering of the coarse lateritic conglomerate which there contains the Implements. This interesting encampment is said by the country people to be the work of the "Corumbur Rajah." Near the "Red Hills" tanks the lateritic conglomerate, which further north contains many Implements, has been quarried and used in the construction of stone circles and Kistvaens.

It would be very interesting if a chipped implement could be found in one of the blocks forming these "Celtic" burying places.

(1) Note.—Kircumbaddy is close to the Tripetty Station on the N. W. branch of the Madras Railway, but fully 5 miles E. from Tripetty town.

ments are found scattered on the surface where the laterite has been eroded by atmospheric agencies.

The Implements many of which were dug up here in presence of Mr. Robinson appear from a sketch of their various forms he has kindly furnished me to agree with those found in the Atrumpaukum nullah sections and to be susceptible of the same classification as further on proposed for the Implements from the latter locality.

The few specimens from Kircumbaddy which have come under my notice were of coarser workmanship than the majority of those found in the Madras District.

The quartzite pebbles occurring in these lateritic conglomerate beds in such vast numbers are derived not directly from the quartzite rocks forming such grand scarps on the Ramagherry and the Naggery mountains lying a few miles to the N. W. and N., but from certain beds of coarse conglomerates and sandstones forming the main mass of the groups of low rounded hills lying east and south east of those mountains.

In the sandstones associated with these coarse conglomerates, Mr. King discovered in the neighbourhood of Sattavedu vegetable remains apparently identical with some occurring in the shales of the Stripermatoor series, and there can be little or no doubt of their belonging to the latter very important series of fossiliferous formations, although they have not as yet been discovered in contact with them because of the great continuity and thickness of the *talus* of debris occurring every where around their base. These old conglomerates to which Mr. King has assigned the name of Sattavedu conglomerates, are of great thickness, and cover a considerable tract of country.

They are as a rule extraordinarily coarse, the included thoroughly water-worn masses varying in size from small pebbles upward to masses a yard or more in diameter, generally cemented together by a coarse dark red brown or purple ferruginous sandy cement, more rarely by a calcareous cement. The nearer we approach to these centres whence the quartzite pebbles were derived, the coarser and more shingly do the lateritic conglomerates become, and finally where they abut on the old Sattavedu conglomerates, the lateritic material is far less than the included masses of quartzite in quantity, and can only be regarded as a cementing material. The cementing material of the old conglomerates being also generally more or less ferruginous, renders it exceedingly difficult and often impossible to distinguish between them and those recent laterite conglomerates where the two are at all much weathered.

The compact laterite generally shows the characters of a true conglomerate, the contained pebbles being rounded and water-worn; but not unfrequently small patches of à few square yards in extent, present all the characters of a *breccia* all or very nearly all the included stones being sharply angular fragments. No reason for this change was apparent in any case noticed.

The thickness of the lateritic formations so far as they have yet been examined in this part of S. India is not by any means large. Even if the Cuddalore Sandstones and grits be *bonâ fide* a member of the lateritic series as they appear to be both at Cuddalore and the Red Hills (near Madras) the utmost aggregate thickness most likely falls far short of 150 feet. The section in which they are most fully exposed is, that in the cliffs on the south bank of the Corteliar near Yermootapolliam about 2 miles west by S. of the ford by which the Madras Nellore road crosses that river. The cliffs there are from 30 to 60 feet in weight.

The Implements have as yet only been discovered in the laterite which is the uppermost member of the whole series and which no where exhibits a thickness of more than 15′ or 16′ at the greatest.

The lateritic conglomerates, gravels and sands all exhibit the appearance of deposits rapidly accumulated, for although the formation of the prodigious quantities of quartzite shingle and gravel they contain, must have required a period of considerable duration for their production, yet can such period not be referred to the laterite age, but to one of far greater antiquity.

As already before mentioned, this shingle was derived from the Sattavedu conglomerates which belong to the Stri Permatoor series.

The evidences of the artificial origin of these Indian Stone Implements are the same as those already so often given of the flint Implements in Europe--namely their all showing, however rude, that there was design in the shape given to them. This cannot be doubted by any one who has had the opportunity of examining even a moderate number of these Implements—and the figures given of some selected specimens will, it is trusted, amply satisfy even the most sceptical that design is clearly traceable in all, however various their shapes may be.

As Mr. Prestwich originally pointed out in his admirable paper read before the Royal Society in May 1859,* the casual resemblance of a piece of naturally broken flint to an Implement for warlike or industrial purposes is not an impossibility, though such resemblances are of extraordinary rarity—for no natural causes that are known would produce such an effect.

If a pebble of flint or quartzite, which in its fracture differs from flint only in so far as depends on the greater coarseness of its grain, is exposed to blows and friction in the current of a rapid and powerful stream, it is either gradually ground down to a smaller size or is split into irregularly shaped fragments which in their turn are worn down and rounded at the edges, and in course of time become smaller pebbles themselves, and if the operation be sufficiently long continued are perfectly rounded off.

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* See Philosophical Transactions 1860, p. 277.

An angular fragment of any hard rock submitted to such a process of attrition becomes a pebble—*i. e*, becomes rounded by wear.

The characteristic feature possessed by all the Implements is that they are shaped to show a cutting edge lying in one plane with reference to the axis of the Implement, and this without regard whether their shape is oval, discoid, pointed like a spear, or broadly wedge-shaped like a hatchet. In some of various types this edge goes entirely round the Implement as in those figured in Plates IV, VI, VII, IX and X; in others it occurs on three sides and a blunt base is left; in a third type only two edges exist tapering to a point and with a blunt base—in a fourth three sides though evidently trimmed are obtuse, and the fourth has a sharp cutting edge.

In those Implements which have themselves been exposed to the action of moving water, the process of conversion into true rounded pebbles is clearly visible.

Various persons to whom the quartzite Implements have been shown have objected that they bore an air of newness and were not weathered. It suffices to show a freshly chipped surface of the same stone to satisfy any one that this is not the case, but that in most of them a very perceptible amount of weathering has taken place and given the surface a genuine appearance of antiquity.

In many cases the alteration of the stones extends inward from a twelfth to an eighth of inch, and the stone is seen to have lost its semi-vitreous lustre and to have altered in color—generally having become darker—many however have undoubtedly been bleached.

In a few specimens, this bleaching process has gone so far that the stone has in parts become perfectly white and its texture closely resembles that of fine loaf sugar, but it is not quite clear that this may not have been the state of the stone when taken in hand to be converted into an Implement.

The specimens found exposed on the surface by denudation of the rock in which they had lain imbedded are almost invariably much more weathered than those discovered *in situ*—showing thus that the greatest amount of weathering results from perfect exposure to atmospheric influences.

The color of the Implements is considerably affected by the nature of the matrix : especially in the massive lateritic conglomerate by the amount of iron contained in it.

The dendrites on the chipped surface which are regarded as one proof of genuine antiquity in the case of the European flint Implements, occur rarely if ever on the Indian Implements. Out of nearly 100 specially examined not one showed these dendritic markings.

Films of carbonate of lime encrusting the Implements are of very common occurrence ; indeed in various places the cementing medium of the conglomerate consists largely of Kunkur which adheres strongly to the surfaces of the enclosed Implements, as in the case of the hatchet shaped Implements figured on Plates XI and XII.

The numerous quartzite Implements derived from the quarternary formations of the Madras and North Arcot Districts present as already mentioned a considerable variety of form.

Three leading classes may conveniently be distinguished, which generally coincide with the divisions recognized by

Mr. J. Evans, the eminent Archæologist, among the European flint Implements, but which contain forms he does not describe.

These three principal classes are :—

Class I—Implements with one blunt or truncated end.

- *a.* Pointed weapons (spear heads).
- *b.* Wedge shaped weapons (axes—hatchets, &c).

Class II—Implements with a cutting edge all round.

- *a.* Implements pointed at one or both ends.
- *b.* Oval or almond shaped Implements.
- *c.* Discoidal Implements.

Class III—Flakes.

Of these three classes and their sub-classes Nos. I *a*, II *a*, and *b* and III agree with those adopted by Mr. Evans—the remaining two sub-classes include forms which apparently have not been met with in Europe, and mention of which I have been unable to find in the few books on the subject to which I have had access in Madras.

Among the Implements assigned to the first sub-division of the 1st class, two varieties may again be distinguished corresponding with the two varieties pointed out by Mr. Evans, whose description of them and their probable uses is perfectly applicable and may be quoted with advantage.

Speaking of these weapons, he says, " Of these there are two varieties; the one rounded at the point, its outline presenting a sort of parabolic curve, the other acute pointed with sides curved slightly inwards. The edges of both kinds are to a certain extent made sharp, but not so much so as the points, and altogether they appear better adapted for piercing than for cutting. Both shapes are usually truncated at the base, and at that end frequently show the original form of the flint."

"It is of course impossible to say for what purpose they were intended; but they may have been attached to the end of poles so as to form spears or darts, or used without any handle for grubbing in the ground, or as wedges for spliting wood."

"I know of no analogous forms among the Celtic Implements; some of the rudely chipped arrow-heads found in Ireland and elsewhere present the nearest approach to it, but are far smaller in size, the weapons from the drift being usually from 5 to 6 inches in length. The ordinary form of Stone Celts is, as you are aware, intended for cutting at its broad end, the narrow end being inserted in the socket of the handle; these on the contrary cut or pierce at the narrow end while the broad end appears intended to rest against a step or bracket or to be held in the hand."(1)

To this sub-division I *a* belong the Implements figured in Plates III and VIII.

The form of Implements constituting the second subdivision of the first class, the wedge shaped, is as before mentioned, one not described by Mr. Evans, nor so far as I have been able to ascertain, known in Europe.

In type the wedge-shaped Implements approach slightly to the stone weapons of the Celtic era by possessing one broad cutting end—but the other rarely tapers to a sharp point—on the contrary it is often as broad as the cutting end, and sometimes much broader, nor is there any attempt to round off the angles of fracture produced by the chipping, much less to polish the general surface.

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(1) Note.—See Letter from J. Evans, Esq., F. S. A., published as Appendix A to Mr. Prestwich's paper in the Phil. Transactions for 1861, page 311.

Occasionally the Implement is found to have been trimmed all round, but the sharp cutting edge occurs only at one end, and is then as in almost all cases caused by the meeting of two large plane surfaces, each apparently the result of one well applied blow of the trimming instrument.

Whether these Implements were used as axes or wedges, in other words were fitted with handles or held in the hands only, it is of course impossible to decide, but they certainly give the impression of having been effective instruments. There is no evidence yet to show whether or not the makers of these rude stone Implements used canoes, but it seems not improbable that they did. If they were acquainted with the art of hollowing out tree stems with fire, the larger and heavier specimens of wedge shaped Implements would furnish admirable tools for scooping and chopping away the charred wood from the sides so as to allow of fresh applications of fire till the excavation of the canoe had progressed sufficiently. The larger specimen of this form would more especially have been suitable for such a purpose, *e. g.* a specimen found by Mr. King at Kircumbaddy, which measured 12 inches by 4 or 5 inches and is of considerable weight.

The smaller specimens such as those figured in Plates XI and XII must have been very formidable weapons if fixed to handles like axes—and would have served to inflict terrible wounds on any foe.

For cutting wood, if they ever were applied to such a purpose, their power would probably be very inferior, as they would most likely lose all their edge after a very few blows. In some few specimens the cutting edge is quite on one side and suggests the idea of their having possibly been used as adzes, with the edge placed transversely to the axis of the handle to which they may have been adapted.

A variation of this form of which I found one example in a ravine in the Sattavadu hills N. W. of Woodecottah, shows a rather sharp point opposed to the sharp cutting edge.

These two forms, the spear-heads and hatchets, are of much rarer occurrence than most of those which must be referred to the second principal class.

The second class of Implements which now demand our attention includes as before stated three leading variations of form—but all furnished with a cutting edge all round. The first of these varieties includes such Implements as are worked to a sharp point at one or both ends. The object of this form of Implement is far less easy to divine than that of the two foregoing forms—more especially with regard to the smaller specimens of short proportions; for if they were inserted in a notch at the end of a pole or bamboo to be used as spear heads, the sharp edge would tend to split up the wood, when thrust against any resisting body. This difficulty is less apparent in the case of those of more elongated shape, *e. g.*, those figured in Plates I, II and IV, which may possibly have been employed, not as spear-heads, but as hammers or picks, being attached to a handle transversely so as to form a T shape.

This sub-class is connected with the following one which comprehends the oval and almond shaped Implements by many intermediate shapes to which it is often hard to assign a place. By far the greater number of our Indian quartzite Implements belong to this sub-class. The purposes for which they were constructed of this more or less elongated oval shape are by no means obvious. The absence of corners such as occur in the hatchet head figured in Plate XI would certainly give the cutting edge greater power of endurance; and possibly it was found easier to obtain the requisite amount of acuteness for the cutting edge by chipping the stone into an oval shape. In the best finished and best preserved Implements, the angle of the cutting edge will be frequently found to be less acute than in the rougher Implements made with may fewer blows of the chipping instrument. Experience no doubt had shown to the workman of that ancient period that the less acute edge was of far greater endurance.

Mr. Evans thinks that the large sized specimens of the analogous flint Implements may have been used as axes—the smaller as sling stones propelled either from an ordinary sling or from the end of a cleft stick.

He also points out that frequently the variation of form depended on the defects of the flints. Such is unquestionably the true reason for the variation in form of many of the quartzite Implements—the workman had to adapt themselves to their materials, and in some cases where the original form of the stone or pebble suited them, they retained it. The greater or less degree of skill possessed by the workmen would also inevitably appear in their several productions.

From the smaller and rudely made oval Implements, such as may have been employed as sling stones, the transition to the sub class *c* of discoidal Implements is obvious.

These certainly exhibit less of skill and design than any of the other unequivocal Implements—and this renders it increasingly difficult to assign the objects for which they may have been fashioned into a rudely discoid shape. Like the smaller oval weapons they may have been prepared for sling stones. A Native to whom one was shown by my colleague Mr. King, suggested it had been used as a flint for striking fire with.

They have also been thought to be possibly the tools used by the ancient Implement chippers in producing the other Implements.

In size they vary considerably—the largest I have seen was a little more than 4 inches across and rather less than 2 inches thick in the centre. There is also considerable variation in the proportion between the central diameter and the circumference of this form.

The third class finally includes *Flakes*, the simplest forms of stone fragments which could be used by man for warlike or industrial purpopses, and such as do not exhibit unequivocal indications of human design, because their shapes are such as might have been produced by accident in the operations of nature.

Still as such unfashioned Implements are found in the European Implement gravels as well as in the graves of people living at much later periods of the earth's history and of much greater degrees of civilization—it may be as well to draw attention to the occurrence of similar fragments occurring in intimate association with the spear-heads and axe-heads, in the laterite formations. They are not very numerous, and generally of smaller size. The forms which have come under my notice appear to have been used as knives and arrow-heads, and were probably chips formed in the preparation of more elaborate Implements. They present clean cutting edges and points of much greater sharpness than do the best even of the fashioned Implements, and for this reason would be better suited to serve the purposes of knives or arrow-heads. A sharp strong edge like that shown in Plate XIII *a* would be no inefficient instrument for skinning an animal killed in the chase—or for scraping a piece of wood or bone.

The flake figured in Plate XV bears great resemblance to some of the ancient knives found in caverns in Europe as figured in the Geologist Magazine for 1861, page 25, and is but very little more rude than the analogous obsidian flakes used by the Aztees as razors at the time of the Spanish Conquest of Mexico and up to a later period.

The total absence of organic remains from the formations containing these specimens of human workmanship renders it very difficult to arrive at any satisfactory conclusion as to the circumstances existing during their deposition over so wide spread an area.

There seems reason to believe, however, that the lateritic conglomerates and sands were deposited at the bottom of a shallow sea studded with mountainous islands between which flowed strong and rapid currents. This sea flowed far up among the quartzite mountains of Naggery and Calastry. The few islands which raised their heads above its surface, were probably only those points exceeding 400 feet in elevation above the present sea level, including in the immediate neighbourhood of what we now know as the city of Madras, the Palaveram, Vendaloor and Mullapode hills.

Further South only the Apoor Hill, and the summits of several hills at Condingee, Chingleput and Tirukarikunum formed a sporadic Archipelago.

In a westerly direction the laterite sea probably broke against a generally low gneiss coast trending in a N. N. E. direction, from near Covrepauk to the neighbourhood of Naggery Nose. East and N. E. of the Naggery Nose mountain, three or more rather large islands lay off the coast and in a great measure yielded the materials of which the lateritic deposits are formed. These islands which now form the Alicoor and Sattavadu hills were very probably inhabited or visited by the people who made the quartzite Implements which are at present the only record of their existence.

Of the Flora and Fauna of these islands, and the mainland, no remains have as yet been discovered, a few fragments of fossil wood excepted which will probably prove to belong to the same species as the fossil trees of Tiruvakkarei near Pondicherry(1).

We have therefore no indications of the climate then prevailing nor any means of further correlating the relative age of the lateritic formations.

The numerical distribution of Implements, over a great part of the area(2) in which they occur, appears to have depended less on the distance from the mainland and islands of the period than upon the direction of the currents or whatever else may have been the distributing agency. This agency, whatever it may have been, would appear to have acted chiefly in an easterly direction from the flanks of the Alicoor and Sattavedu hills, for the lateritic deposits lying South-westward, Southward and South-eastward of those hills contain far fewer Implements than those lying to the East of the hills in question which doubtless formed a group of three or four rather large islands in the laterite depositing waters(3).

That very many of the Implements if not the majority owe their present positions in the lateritic deposits to the moving power of water is amply proved by their showing marks of attrition, which in some few cases had been continued so long as nearly to obliterate the chippings and so almost to re-convert them into water-worn pebbles. Other

(1) NOTE.—These have been described and figured by Professors Schleiden and Schmidt under the name of Peuce Schmidiana in their work on Silicified Wood (Überdie Naturüder Kiesel Hölzer.)

(2) NOTE.—The Implement bearing laterite formations which I have personally examined and which alone are here referred to lie between the Palar river on the South and a line drawn from Naggery, through the village of Sattavedu, to the Pulicat lake on the North.

(3) NOTE.—The laterite deposits lying Westward of the Alicoor hills are mere debris of the probably extensive formations which have been removed by denudation.

specimens however of these Implements retain their sharp thin edges so perfectly and the irregularities of the chippings are so fresh that it is evident they can have been drifted only a very short distance, or not at all. With regard to such Implements it appears more reasonable to ascribe their presence to other agencies. What these other agencies may have been is as yet quite unknown, and in the absence of any evidence bearing on the subject all attempts to explain the occurrence in places of great numbers of perfectly preserved Implements must be purely hypothetical.

The most probable hypothesis appears to be that these perfectly preserved Implements owe their positions to human agency, for we cannot conceive of any other power distributing them over the bed of the sea, the action of rapid and strong currents and the carrying power of ice being inadmissible in these cases.

The next step in the hypothesis is to explain how human agency may reasonably be supposed to have been instrumental, and the question now presents itself. Were the shingly mud-banks which now constitute the laterite beds (more especially those lying between the present Narnaveram and Corteliar rivers, to the North of the former river and at the North end of the Red Hills laterite area) permanently below the moderately deep sea of that period or were they left partially or entirely uncovered by the ebb of the tide? Unfortunately the evidence as yet obtained does not suffice to answer this question.

If the former condition of moderately deep water is supposed to have prevailed, recourse must be had to the supposition that the Implement-makers were accustomed to go out to sea in canoes or on logs of wood tied together, like the Catamarans now in use all along the Coromandel Coast.

By the upsetting or foundering of these during sudden squalls, numbers of Implements in the best state of preservation may have sunk to the bottom to be imbedded in the mud-banks. The fact of these ancient men having possessed axes and adzes(?) certainly lends color to the supposition of their having been able to make canoes and catamarans. If the laterite mud-banks be regarded as having been intertidal, the hypothesis of the boats is in no way invalidated, for without them the people could not have ventured to wander so far away from *terra firma,* as we find perfectly preserved and unrolled Implements, *e. g.*, the laterite plateau on the right bank of the Corteliar immediately west of the present Madras, Nellore high-road, and the laterite gravel and conglomerate at Palaveram.

It might be objected to this that these eastern spreads of laterite were of much younger date than those around and near the base of the Alicoor and Sattavedu hills, (the principal islands in this portion of the laterite sea) and that the former were deposited only after the elevation above sea-level of the latter more westerly parts of the formation, around which they formed as it were merely an intertidal fringe of shoals during part of the period of elevatory movement : hence these extreme easterly beds might have been visited during ebb-tide from the higher lying and permanently uncovered mud-flats without the use of boats.

But there is no evidence to prove such a great difference of age and the mineral and strati-graphical characters tend to prove that the eastern parts of the lateritic formations were deposited at a considerable distance from land, and that if they were not absolutely synchronous with, they were of but slightly less antiquity than the more elevated western portions of the formation.

That the ancient men should have wandered over the mud-flats left dry by the ebb-tides in search of food, &c., is highly probable, and their having done so would go far to explain the presence of so many implements close to the surface, nor would it require much ingenuity to imagine numerous reasons for the stone weapons having been lost.

It will be seen in the notes appended to this paper by my colleague Mr. King that he inclines to explain the presence of great numbers of the stone weapons in certain places, as in the valley of the Attrampakkam nullah and in a locality he refers to, lying northward of the Narnaveram river, near Cupedoo, by supposing that those localities were seats of manufactories of Implements for purpose of barter. This idea founded on the presence of some rude and half finished Implements, among many perfect ones and of numerous flakes, is not in any way improbable, but more evidence is wanted on the subject.

The very perfect state of preservation of most of the extremely numerous Implements in the former locality is a great difficulty in supposing the laterite occurring on both sides of the nullah to be a re-constructed conglomerate, as which both Dr. Oldham and Mr. King are inclined to consider it.

In many places the beds contain both water-worn Implements and others which have not been worn by drifting, the latter underlying the former, which indicates that accumulation of laterite mud and quartzite shingle continued after the deposition *in loco* of the unworn Implements. The ferruginous materials of which the laterite mud and shingle banks were constructed were in the case of the formations lying east of the Alicoor hills brought down by rivers occupying nearly the present positions of the Trittany, Naggery and Narnaveram rivers, aided by the marine currents flowing through the depressions in those hills, one of which may now be recognized in the Alicoor valley, and the Narnaveram valley representing another.

The quartzite boulders and pebbles were evidently derived from the conglomerates of the islands of the Naggery and Narnaveram coasts.

The absence of all animal remains in these very interesting formations in which relics of human art are so numerous may in part have been due to the presence in the sea of large numbers of powerful predaceous fish, and, in part also, may we ascribe it to the decomposing effect of the peroxide of Iron, which is so large a constituent of the laterite.

The area over which the lateritic formations were spread has undergone as already stated great changes since their deposition. A great part of the formations has been removed by denudation and deep valleys cut into them, now occupied by the alluvium of various rivers, as the Soornamookey, the Narnavaram River, the Corteliar and Palar.

If the lateritic deposits of Pondicherry, Cuddalore, Woodiarpolliam and Tanjore belong to the same series as those in which Implements have been found, and were once continuous, and we have every reason to believe that they were so,—the excavation of the present vallies of the Punniaur, Vellar and Cauvery through these lateritic deposits, and the accumulation of their respective alluvia must also have commenced subsequently to the appearance of man on the earth.

Of the age of the very extensive deposits of lateritic minerals on the Western coast of India, a considerable part of which certainly appears to be of truly sedimentary origin, we have as yet no information, but it seems not unlikely that they will turn out to be synchronous with those we have now been describing.

The same will probably be the case with the Detrital laterite of Cuttack and the S. W. frontier of Bengal—indeed if these widely distributed lateritic formations should eventually be found to belong to the same series as the typical laterite of the neighbourhood of Madras, but little doubt can remain that the whole or very nearly the whole Indian peninsula has undergone a considerable elevation since man's first advent.

The non-discovery hitherto of any remains of the animals contemporary with the Implement manufacturing men of Southern India, render it as already stated above, impossible at present to correlate the lateritic formation more nearly with the European formations which contain remains of ancient man. There is no reason why we may not yet find such remains and ascertain whether any representatives existed in India of the gigantic extinct Mammalia which were the congeners of ancient man in N. W. Europe—such as the Elephas primigenius, E. antiquus, Rhinoceros tichorhinus, a species of Hippopotamus and the ancient cave inhabiting bears, hyenas and lions.

On the period of time required for this great elevation to be accomplished, it is impossible to speculate safely in the absence of any satisfactory data.

The greatest well ascertained elevation at which our Implements have been found is about 370 feet above mean sea level at Kircumbaddy, and at about 1¼ mile East of Arconum Junction at an elevation of very nearly 300 feet.

If we attempt to form an estimate of the time required for the elevation of the lateritic formations to such a height above the existing sea level—by adopting Sir Charles Lyell's standard rate of oscillation of 2½ feet per century(1) we should obtain a period of about 14,700 years—assuming the rate of elevation to have been constant throughout the whole period.

The first appearance of the human race in Southern India would then have to be referred back to a period yet more remote, but the standard rate of movement adopted is one confessedly arbitrary, and it cannot be doubted but that a far higher rate of elevation than 0·3 of an inch per annum might have prevailed over an area as large as the Indian Peninsula without inducing catastrophes and cataclysms on the scale required by the cosmogonists of last century,—without, indeed, inducing any paroxysmal phenomena whatsoever. If we may conclude from the striking resemblance of the objects of their respective manufacture, that the people who made the quartzite Implements of Southern India were contemporaries of those who manufactured flint Implements in Northern France and other parts of Europe, it is not unreasonable to argue that the climatic conditions existing in India may have been analogous to those which prevailed in North-western Europe at that ancient time. It has been shown by Mr. Prestwich and other Geologists who have treated the subject, that the climatic conditions in North-western Europe at that period were those of great cold accompanied by copious deposition of atmospheric moisture, this would indicate by analogy the prevalence of an extremely wet climate in the tropics. The prevalence of such an extreme climate during the period of emergence of the lateritic deposits, would go far to account for the immense denudation they exhibit, having been effected in a comparatively short period, and which the existing atmospheric agencies may appear totally unequal to. To quote the words of Mr. Prestwich(1) " we should have, Agencies in operation so far exceeding in power any now acting in these countries that it is impossible to apply the same rules to the two periods; the changes described must have progressed with a rapidity of which we in the present day, can in these latitudes hardly form an adequate conception."

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(1) Note.—The rate of 2½ feet per century assumed by Sir Charles Lyell as his standard of oscillation, is the ascertained rate of elevation of the land now in progress in part of the Scandinavian Peninsula.

R. BRUCE FOOTE,

December 1864. *Geological Survey of India.*

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(1) NOTE.—In his lecture at the Royal Institution, 26th February 1864.

INDEX TO THE PLATES.

Plate I.—The first Implement discovered at Palaveram 10 miles S. W. of Madras in May 1863—it consists of moderately fine grained cinnamon colored quartzite. One point is broken off. The figure is of the actual size of the Implement.

Plate Ia.—Shows the same Implement edgeways—the edge shown being the right hand one of full view (Class II a).

Plate IIa.—Pointed Implement of slightly coarse brown purplish quartzite from the Atrumpakkam nullah, of the same type as that figured in Plate I.

Plate IIa.—Shows the left hand edge of the Implement turned forwards. This is a very rare form of Implement. (Class II a.)

Plates III and IIIa.—Quartzite spear head of greyish stone from the Atrampakkam nullah. The left hand edge is that shown in plate III *a* (Class I a.)

Plates IV and IVa.—Long oval Implement pointed at one end with a cutting edge all round (Class II b.)

The edge view in Plate IV*a* shows the right hand edge of the Implement which is somewhat water-worn. It consists of yellowish brown compact quartzite.

Plates V and Va.—A large Implement from Moderimbedu, near Sattavedu, with one end oval and the other worked into a very sharp hatchet edge. Found on the surface but evidently derived from the laterite, some of which adheres to the sides. This Implement, which is intermediate between the Class Ib and IIb, is made of slightly coarse quartzite and appears to be stained externally of cinnamon brown color.

Plate Va.—Gives a full view of edge.

Plates VI and VI a,—A long, pointed, oval Implement (Class IIb) of greyish buff fine grained quartzite.

Much water-worn found in situ in lateritic conglomerate in the lime kiln gully north of the Atrumpakkam nullah. The left hand edge is shown in plate VI *a.*

Plates VII and VIIa.—A large and rather rude, long oval, broad pointed Implement of very fine grained quartzite of brownish yellow color with greyish bandings.

This fine specimen which is a link between the sub-classes IIb and Ib was obtained at the Atrumpakkam nullah. Plate VIIa shows the right hand edge.

Plates VIII and VIIIa.—Spear head from the Atrumpakkam nullah.

This extremely well shaped and sharp edged Implement approaches very nearly to the parabolic curve-pointed weapons mentioned by Mr. Evans (See ante page 17.) It is made of fine greenish grey fine grained quartzite, *Plate VIIa.*—Shows the right hand edge.

Plates IX and IXa.—Well-shaped oval Implement with cutting edge all round (Class IIb.) slightly pointed at one end. This Implement which shows an unusual amount of care to have been bestowed on its manufacture was also found at the Atrumpakkam nullah section.

It is made of greyish brown stone with fine greyish bandings.

The right hand edge is shown in Plate IXa. The color is only external, for a slight chip shows the interior to be of grey color—which has thus been weathered brown.

Plates X and Xa.—Small oval Implement from the lateritic gravel at Palaveram—broken at one end.

The cutting edge very sharp and well chipped. The quartzite is externally weathered—a light cinnamon color—but the freshly broken end exhibits a pale dirty-pink. Plate Xa shows the left hand edge.

Plates XI and XIa.—A hatchet head Implement from the Atrumpakkam nullah, found a few yards away from the foregoing one in a freshly formed rain gully.

This Implement shows much calcareous incrustation. Plate XIa is a side view.

Plates XII and XIIa.—Fine axe or wedge-shaped Implement. (Class Ib.) found *in situ* in the side of the Kalingula gully, tributary to the Atrumpakkam nullah (see ante page).

The main part of the Implement which consists of light grey stone is very little weathered, but the base has assumed by bleaching a saccharoid appearance. A few pellets of laterite adhere strongly by a calcareous cement to the figured side of this axe head. The edge view given in Plate XIIa is that of the right hand edge.

Plates XIII and XIIIa.—A flake knife or spear-head from the Atrumpakkam nullah of compact purple quartzite.

The right hand exceedingly sharp edge is shown in Plate XIIIa.

Plate XIV.—Sling stone? An Implement of rudely discoid shape from the Atrumpakkam nullah of greenish grey quartzite.*

Plate XV.—Flake knife? from the Atrumpakkam nullah—of very fine grained light greyish brown quartzite.

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* Front and side views of arrow head(?) From the high lying lateritic conglomerate at Cunjalum; the Quartzite is of a smokey grey colour.

List of places where Stone Implements have been found in the Madras and North Arcot Districts,

South of the Corteliar River.

Palaveram.	10 miles S. W. of Madras.	Among lateritic gravel.	Mr. Foote.
Ooratoor.	13 miles S. W. S. of Palaveram.	Among Kunkurry lateritic gravel.	Do.
Panjur river Section.	4 miles S. W. by W. of Poonamallee.	Among slightly lateritic gravel.	Dr. Oldham. Mr. King.
Stri Permatoor 1½ mile W. of	28½ miles W. S. W. of Madras.	Among slightly lateritic sandy shingle and lateritic gravel.	Mr. Foote. Mr. King.
Parundoor Tank outflow.	8 miles N. of Conjeveram.	Among lateritic sandy shingle.	Mr. Foote.
2½ miles E. N. E. of Parundoor.	....	Do. do.	Mr. Foote.
N. of Trimullavoil.	3 miles from Avady Railway Station.	Among lateritic gravel.	Mr. Foote.
On the top of the cliffs N. E. of Yermootapolliam.	7 miles W. N. W. of the Red Hills.	*In situ* in solid glazed surfaced laterite and lateritic gravel.	Dr. Cornish. Mr. Foote. Mr. Fraser, C. E.

North of the Corteliar River.

At Paliamungalum.	1¼ mile E. of Arconum.	Lateritic debris.	Mr. Foote.
S. E. of Arconum.	(4 miles.)	Do.	Do.
S. and S. W. of Chinamapet Station.	Madras Railway.	Lateritic shingle conglomerate.	Do.
N. of the Station.	....	Do.	Do.
Pyanoor.	2½ miles from Chinamapet Station.	Do.	Do.
N. W. of Tumbool.	8 miles from Tripassore.	Do.	Do.
Sides of bed and gullies of Atrampakkum nullah.	9 miles from Trivellore.	*In situ* in shingly lateritic conglomerate and weathered on the surface.	Mr. King. Mr. Foote.
Cunjalam village.	10½ Do. do.	Among debris of lateritic conglomerate.	Do.
N. of Davendavaucum.	11 Do. do.	*In situ* in lateritic gravel.	Do.
N. E. of Goompullium.	2½ miles N. of Atrumpakkum nullah.	Among debris of very lateritic shingle.	Do.
S. of Malandoor.	3 miles N. E. of Davendavaucum.	Do.	Do.

At Waramderry and 1 mile W. of tank.	3 miles S. W. of Arnee.	Do.	Do.
Munjakaranei.	1¼ mile N. W. of the Yermootapolliam cliffs.	Weathered out of solid typical laterite.	
South of Cupedoo W. of Nagloperam.	(6 miles W. of)	Lateritic gravel.	Mr. King.
North bank of Naggery river at the bend.	4 miles East of Naggery Station.	In lateritic gravel.	Mr. Foote.
On the crest of the pass between Alicoor and Panoor.	Alicoor Hills.	In shingle laterite debris.	Do.
1 mile N. W. of Naikenpollium.	Do.	Do.	Do.
Near Maundoor.	5 miles N. E. of Trittany Station.	Among laterite debris scattered over the surface.	Do.

North of the Narnaveram River.

1 mile N. of Woodecottah.	14 miles N. of Trivellore.	Debris of shingly lateritic conglomerate.	Mr. Foote.
Sirgalpilly ravine in Sattavedu Hills.	Do.	Do.	Do.
Near Moderimbedoo.	5 miles N. of Woodecottah.	Do.	Do.
S. of Boodoor.	1½ S. of Sattavedu.	*In situ* in lateritic conglomerate.	Do.
Caradepootoor tank N. end.	6 miles S. by E. of do.	Do. Do.	Do.
Sattavedu.	27 miles N. by E. from Trivellore.	In shingly Do.	Do.
Paundavaucum.	3 miles N. E. of Sattavedu.	*In situ in* Do.	Do.
Cunumbaucum.	2 miles N. E. of Paundavaucum.	Solid laterite, *in situ.*	Do.
Santapore.	4 miles N. E. of Sattavedu.	Solid laterite.	Do.
Maderapaucum.	Do.	Do. *in situ.*	Do.
1½ mile East of Roshannuggur.	2½ E. of Sattavedu.	Solid laterite, *in situ.*	Do.
Amerumbardoo.	5 miles E. S. E. of Sattavedu.	Do. Do.	Do.
Ingawarpolliam high grounds.	8 miles E. of Sattavedu.	Do. Do.	Do.
Survaydoo.	3 miles S. E. of do.	Laterite gravel.	Do.
Pulloor.	6 miles S. E. by E. of do.	Do. and solid laterite.	Do.
2½ miles N. of Cupedoo	6 miles W. of Nagloperam.	Lateritic gravel.	Mr. King.
Kircumbaddy.	Madras Ry. N. W. Line.	Solid laterite and lateritic gravel.	Mr. W. R. Robinson, C. E.

Note.—Excepting Kircumbaddy, all the above localities lie within the limits of sheets 78 of the "Indian Atlas."

APPENDIX.

Notes on the occurrence of Stone Implements in North Arcot District. By WILLIAM KING, Jun., B. A. *Geological Survey of India.*

After our discovery of these Implements in the Trivellore Taluq of the Madras District, my attention was naturally directed to any area over which might be spread debris, or shingle, of quartzite at all resembling that lying round the base of the Allicoor hill-group, and from which we knew that the Trivellore Implements had in all probability been manufactured.

The country to the North West of Trivellore Taluq is frequently strewn with much shingle, and it was not long before I found several specimens: first, in several parts of the valley between the Nagloperum and Naggery Hills in the Narnaverum Taluq of the N. Arcot District; and second, in the neighbourhood of Kirkumbady on the North West Line of Railway, about a mile or so north-west of Tripetty Station.

A. Narnaverum Area.

Over the first, which may be designated by the above name, worked Stone Implements and other evidences of their manufacture were found in three places not very far apart.

Locality (1) is situated on a tract of low rising-ground which stretches out from the eastern side of the Naggery Nose hill-mass. At about two and a half miles S. S. W. of Cupedoo (ten miles along the new high road running east from the Pootoor Station, N. W. Line) there is a small old pond or tank lying between some irregular and rocky trap dykes, and among the gravel and earth dug out of the bed of this tank were three Implements. They were associated with loose shingle and pebbles of quartzite and a few flake-like fragments or splinters of stone.

To the east of the tank, on the road between Nonra and Cupedoo, I saw occasional flakes of quartzite as well as an oval Implement which had evidently been once embedded in the lateritic deposit now forming the substratum; the implement was stained of a dark ferruginous color and partly encrusted with ferruginous sand and gravel. This laterite is a highly ferruginous conglomerate and breccia, containing rounded and sub-angular fragments of quartzite besides debris of other rocks.

Locality (2). Again, at about three quarters of a mile north of Cupedoo, I found five† Implements (four or five others were picked up by my men) of the longer pointed oval form, lying scattered round the edge of another small shallow tank, together with much quartzite gravel, shingle, and some

†1. Tapering oval, with sharp end broken off.
2. Small long oval.
3. Broad tapering oval.
4. Tapering oval.
5. do. do.

flakes. These Implements and debris had evidently been dug out in the excavation of this tank.

Here, the ground is not altogether made up of gravel and breccia as is the case to the south of Cupedoo, but consists of alluvial sandy and clayey deposits of a grey and yellowish-grey color with two or three layers of quartzite gravel and shingle as well as lateritic gravel. Rounded and sub-angular fragments of quartzite are also irregularly scattered through the most superficial layer of alluvium. This tank, like the first described and many others in the neighbourhood, is not an ordinary bunded tank or reservoir of water formed by throwing a bund across a shallow stream-valley, but is merely a pond made by digging out the earth for two or three feet from a natural depression, while the earth thrown out at the sides helps to retain more water. It will be thus seen that the raised banks of earth and gravel whence my Implements were procured are not likely to be made of material brought from a distance, as is sometimes the case in an ordinary tank bund, and therefore the conclusion is that the weapons in question have either been made on the shores of the tanks or that they were dug out with the earth. The latter supposition seems the more likely one, for the few Implements found at both tanks were scattered about very irregularly among the other stones of the gravel, and required very long and careful search before they were recognized. In coloring and weathering too, they were not to be distinguished from the other stones lying about: the distinctive characters being the regular form and, more particularly, the plane-edge all around the Implements, the latter character being unknown in any naturally-formed fragment of rock. Besides, in the case of the tank under description, the ground for long distances from it was thickly strewn with rounded and other fragments of quartzite without, as far as I could see, and my research was extremely close, a single flake-like fragment, or Implement any where except near excavated ground.

A short distance further north of this tank, nearly two miles N. by E. of Cupedoo, and at the southern end of an irregularly rocky ridge, there is another small and shallow pool close by which, at the time of my visit,‡ the villagers were digging a 'bowri' (well); and among the shingle thrown out was a chipped fragment of quartzite. The layer of shingle whence this had been dug is eighteen inches below the surface and would nearly correspond to the depth of the gravel and shingle from the bottoms of the tanks already referred to.

The next locality (3) of Stone Implements is a most interesting one in so far as it seems to have been a place of manufacture. It lies towards the north end and on the west side of the rocky ridge mentioned above, two and three quarter miles N. by E. of Cupedoo. The flat ground at the foot of the ridge and extending nearly to the stream flowing southwards to the Narnaverum river, is formed by a deposit of lateritic sand, gravel, and breccia, partly overgrown with scrub-jungle. Sub-angular and rounded fragments of quartzite are frequent on the surface, but, as far I could see, there are no Implements. This general level of the ground is, however, broken by a shallow depression; the result of the scouring out or denudation of an extensive patch of the lateritic deposit down to the underlying gneissic or crystalline rocks. The thickness of the deposit is very variable owing to the irregular surface of the rocky ground on which it rests, but it may be taken on an average as between one and three feet.

‡ October 1863.

Numerous fragments of quartzite were lying on this denuded surface as was the case on the adjacent level ground; but, in addition to these, were plenty of flakes and Implements (of which I picked up ten§) besides a number of imperfect and broken specimens. The weapons brought away are very well made and trimmed to a more regular shape than the generality of those which we have found. The specimens referred to as imperfect suggest the idea that they had been discarded or left unfinished; for some of them have the whole of one side uniformly chipped, while the other side is trimmed only for a short distance from the edge, leaving a ragged lump which only requires knocking off to make the Implement symetrical as to its sides. Another example (No. 5) illustrating incomplete manufacture presents nearly three quarters of the plane edge reduced by repeated chipping to a pretty regular straight line; while the rest is a decidedly wavy line, the result it would seem of preliminary dressing.

One specimen (No. 3) from this locality is a very perfect example of the long and flat oval or almond-shaped variety. It has been very much chipped so that the surface of both sides is somewhat smoother than is usual in these weapons; the edge, continuous all round the stone, is almost an uniform line without any irregular waves. This Implement is so sharp on its edges and so fresh-looking that many people in Madras to whom it was submitted for examination were rather doubtful as to its antiquity: and I am sorry to add that when it was returned to me this hitherto beautifully uniform edge had been slightly chipped by the graver doubters, so that the light reddish grey color of the fresh surfaces thus exposed bore strong witness to the genuine antiquity of the dark purplish brown hue of the old surface.

The Implements many of which were left on the ground lie scattered irregularly over the dunuded area; but I was struck by the more frequent occurrence of these as well as of chips around some low hummocks of gneiss rising out of the surrounding ferruginous gravel and laterite on the northern side of the denuded area. I noted three of these hummocks of protruding rock at short distances from each other and beside these were evidences of stone-chipping.

Such assemblages of weapons and flakes around hummocks of rock may be most reasonably accounted for by supposing that they had been collected there by the action of moving water, just as gravel and shingle are piled up on the sheltered side of a rock in a river bed. I did not note any particular arrangement of the stones lying about these rocky spots, indeed as far as I recollect they were so few and so scattered that scarely any arrangement could be recognized. In the excitement and hurry of picking up the specimens I neglected to observe this; in fact, a good many were collected before I noticed their special mode of occurrence beside the hummocks. I must confess, morevoer, that at the time of my examination a very different reason for the occurrence of the fragments

§1. Square-edged axe-head (ferruginously stained.
2. Do. do. (do.)
3. Large flat tapering oval (do.)
4. Small round oval (do.)
5. Medium sized round oval (do.)
6. Small round oval.
7. Heavy tapering oval.
8. Small tapering oval (much water-worn.)
9. Tapering oval.
10. Tapering oval.

at these spots was apparent in my mind; for, as I sat there on one of the knobs of gneiss looking at the scattered fragments and stone hatchets, or spear heads (whatever their use may have been), I could not help thinking that the Implements might have been manufactured beside the groups of rocks.

There were not nearly so many Implements in this locality as we found and saw in the supposed site of manufacture in the Trivellore Taluq, but there was likewise not the same enormous amount of suitable material; and when the two regions are compared my Narnaverum area becomes a very insignificant place of work. However, in comparison with other places where I have found stone weapons, with the exception of the locality to be described next, the number found at this little area of denudation is large.

Unfortunately, I found no specimens *in situ, i. e.,* embedded in the lateritic gravel and breccia from which I suppose them to have been derived; even in alluvial deposits which looked much more promising, we had to dig away some yards of a river bank before our implement was found, while the chances of finding anything among the already broken ground are very variable. For instance, I have examined the little gullies along a river bank for more than a mile without success; when suddenly in the bottom of a rift in the bank I found a little gem of a weapon, and close by five large implements, all of the same shape, which had evidently fallen out of a layer of shingle just above.

It cannot at present be said whether the weapons lying about over the denuded area at Loc. 3 were originally enclosed in the laterite which once extended continuously over the depression, or whether they had been manufactured subsequent to the formation of the hollow. The ferruginous coloring of the implements is a slight indication in favor of their having been enclosed in the laterite, as is also the fact of their being only as yet found lying on this denuded area; though, indeed this last condition may be as plausibly used to show that they are newer than the laterite and that the scoured-out patch of ground was a most convenient place for manufacture as the stones were at hand, having been worked or worn out of the laterite.

If stone weapons should hereafter be found enclosed in the lateritic deposit it would then in all probability turn out that they are more ancient even than those found in the drift at Trivellore, because the corresponding drift deposit in the Narnaveram valley is newer than the lateritic breccia on Loc. 3.

B. Kirkumbady area.

The old Kirkumbady Fort (Loc. 4) on the Madras N. W. Line of Railway may be taken as a land-mark for this area.

Some coarse lateritic road material was being dug up close to the railway, where it passes by the fort, during my short stay in that neighbourhood in October 1863; and amongst the heaps of this material were two rough stone implements one of which was very large and of a rude axe-head form. It was about 12 inches long and 4 or 5 inches wide at the square edge. The finding of these two specimens led me to look for others in the neighbourhood, but it was not until the beginning of this year that I succeeded in finding several of the pointed oval form. These were lying scattered at intervals over the rising ground, to the west of the line of rails, on each side of the stream which flows down between the Tripetty Station and the Engineer's bungalow at Kirkumbady fort, and were associated with a good deal of quartzite debris and shingle.

At the finding of these last, my friend Mr. W. Robinson, of the Madras Railway, was with me, so that he had an opportunity of seeing how the chipped stones generally occurred. Since this, he has not only found many about the same place, but also numbers immediately in the neighbourhood of his bungalow at the fort; so many indeed, that he was able to send me about thirty very good specimens which are now in the Geological Museum in Calcutta. Some of these were found among the ballast diggings near the fort, but there is not sufficient evidence from the workmen to show how the implements were exactly situated.

It must not, however, be supposed that the specimens have been found by the workmen in that part of the ballast which is decomposed granite *in situ*; rather that they have been found in the superficial gravel or drift covering the rising ground whence the Rail-road material is obtained. Within my own observation the diggings have been very much extended superficially, the granite being only decomposed to a moderate depth; so that it was doubtless from the superficial gravel freshly opened up that the weapons were extracted.

The finding of such large numbers of implements in the Attrampakkam and Kirkumbady (Loc. 4) areas, as also to a smaller extent in the Narnavaram region (Loc. 3), while only isolated specimens have been collected in other places has caused some little speculation as to the reason for such assemblages of artificially worked stones; the main idea being that they were collected in these places by the action of currents, or that the localities were sites of manufacture. In the case of the Narnavaram region (Loc. 3), there may possibly have been some current action in order to bring about the arrangement of the weapons, &c., round the hummocks of gneiss; but the number of worked stones in so small an area is in favor of its having been a place of manufacture. More observation will however be required before anything satisfactory can be said about the place.

In the other two great localities (Attrampakkam and Kirkumbady) there does not seem to be any system of distribution of the weapons over the ground; at least we did not observe any. There must of course have been some drifting but it would be very local, and we could hardly expect to find implements drifted on to the higher grounds in such numbers as we have found them. The Kirkumbady area is about the most elevated low-ground in the Soornamookey valley. It is also sometimes easy to distinguish stones which have been drifted when found *in situ*, from the way in which they occur: for instance, when found together in layers of gravel in the alluvial deposits, or when they are found in the bottoms of river gullies in cases of two or three or even five specimens which have evidently fallen down with the clay and gravel forming the sides of the gully; whereas, in the localities which we suppose to have been places of manufacture, the specimens are found scattered here and there in numbers among the rounded quartzite debris over open and elevated ground without any apparent arrangement in groups or lines.

One of the great reasons adduced against the idea of sites of manufacture is that people in such a low state of civilization, as the workers of these rude weapons must have been, had not arrived at the idea of manufacturing certain commodities in one place for purposes of barter with other tribes. In fact, that each tribe, or family made its own commodities; or, for example, if a man wanted a stone weapon he looked about for a suitable stone and made the weapon then and there.

This would, of course, be the ordinary mode of procedure where material was always at hand or where it was only procurable in small quantities at chance places: but, in this age of Stone Implements in S. India, when as far as we know the only material used was quartzite even at long distances from any place where quartzite occurs in the required form, the people must have been in many cases compelled to resort to places where material was procurable. Here then, each would probably make his own weapon on the spot in preference to carrying away a few suitable stones—in which case there would in time be a large collection of finished, unfinished and broken weapons lying about the neighbourhood besides a great quantity of chips—or, as I am inclined to suppose, the people of the place (if it happened to be a settlement) manufactured weapons for the others. Supposing too, and there is some reason for this supposition, that some of the places where stone was abundant were islands, the inhabitants would have an incentive to prepare articles for barter, in so far as they might be supplied with articles of great value to them which were only procurable on the mainland. This coincidence of the abundance of implements and of the raw material for their manufacture certainly occurs in the districts we have named, for we found that the suitable material (shingle and rounded debris of quartzite) occurs close by these localities in large quantity, while it is not so easily procurable in adjacent parts of the country. These are, however, the present condition of the country regarding it as an area of dry land. There is good reason nevertheless, to argue that its aspect must have been very different either when the implements were in use or subsequently : for, as has already been shown by Mr. Foote, the stone weapons were found regularly deposited at different depths in the alluvial lateritic drift(1). Hence, it may be assumed that so much of the country as is covered by these apparently younger lateritic formations was under water at the time of their deposition. It cannot, however, be definitely ascertained that the country was thus partially submerged at the time of the manufacture and use of the worked stones, though this was probably the case; the very fact that most of our specimens which were not buried in the alluvium were found on the higher grounds is somewhat in favor of the contemporaneity of the period of manufacture and such an aspect of country.

The Kirkumbady area is very interesting in this way, for the wide valley of the Soornamookey, in which it is situated, must from the great extent of its alluvial deposits have been an area more or less covered with water and probably not unlike the present swampy and lagoon region of Pulicat and the coast area further north : except that it was enclosed by the fine ranges of the Tripetty, Calastry, and Naggrum Hills. Along the shores of this partially submerged valley, and here and there even towards the middle were low sand banks and rounded rocky islands. The elevated ground of Kirkumbady Fort was one of these larger islands, and upon it there was a large quantity of material fit to be made into stone implements, abundant refuse of which we have found on the highest parts of the ground and in the neighbourhood.

Much of the Soornamookey valley was already geologically surveyed before I became acquainted with the appearance and mode of occurrence of these ancient evidences of man's existence, so that many bits of rising ground on the south side where we might expect to find remains of this kind, were passed over (as far as looking for weapons was concerned) carelessly. The country about the Poodi Station on the N. W. Line might be, from the quantity of quartzite debris &c. scattered about almost down to the Soornamookey, a locality for these chipped stones, and would be well worthy of a close search.

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(1) NOTE.—No implements have been met with in the much younger true fluviatile alluvium with which the " alluvial lateritic drift" must not be confounded—R. B. F.

The physical features of the Nagloperam and Narnavaram valleys are pretty much the same as those of the Soornamookey area but on lesser scales. The valley of the Narnavaram river extending between the two villages named above, and the spread of country which lies between the Naggery and Narnavaram rivers are quite flat, being covered with alluvial deposits.

At the time when this country was thus submerged, the broad spit of high ground already described as lying to the south of Cupedu must have been a long promontory of land with water on all sides except the western which rises upon the east side of the Naggery Nose hill-mass; while the area (Loc. 3) in the lateritic breccia to the north was probably just on the shore of an irregularly swampy bit of country into which the weapons dug out of the tank (Loc. 2) north of Cupedu must have somehow found their way.

VEMANA. BY MAJOR R. M. MACDONALD, MADRAS STAFF CORPS.

వేమనపద్యములు. *The verses of Vemana, Moral, Religious and Satirical, translated by* CHARLES PHILIP BROWN *of the Madras Civil Service, Madras. Printed at the College Press*, 1829.

IN the whole range of Telugu literature there is perhaps no author whose writings have attracted so much notice among Europeans as those of Vemana. The Christian divine carries on his warfare against heathenism with weapons drawn from the armoury of this Hindoo moralist. The young civilian makes his acquaintance in going through the course prescribed for the honorary reward. The teacher finds him read in every school supported by Government. The greatest living Telugu scholar has translated, and annotated a large portion of his writings.

The first edition of Vemana was published in 1829 by Mr. C. P. Brown, who informs his readers that after collating nine manuscripts, he succeeded in collecting about 2,000 stanzas, which he arranged in five divisions, religious, moral, satirical, mystic and miscellaneous. The two last, which constituted more than half the work were considered by the compiler devoid of interest. Six hundred and ninety-three stanzas selected from the first three parts were printed with an English translation and notes. Mr. Brown published a second edition of Vemana in 1839. In this edition the translation and notes are omit-

Religious......	200
Moral...........	214
Satirical.., ...	279
	693

ted, but great additions are made to the religious and moral sections. Since then several small editions of Vemana have issued from the London Mission Press at Vizagapatam and the Public Instruction Press. With the exception of a few verbal discrepancies they are all identical and contain 201 stanzas taken in the proportions noted in the margin from Mr. Brown's second edition.

Religious......	416
Moral	468
Satirical... ...	279
	1163

Religious......	68
Moral...	51
Satirical... ...	82
	201

Little or nothing seems known regarding Vemana. Mr Brown at first supposed that he was by birth a Kapu or farmer, that he lived about the beginning of the 17th century, and that he was a native of the South Western parts of Telingana. "Some assert" he observes, "that he belonged to the family of Ana Vêma Reddi, a chief in the Candanul (or Kurnool) country; and the brother of the poet is said to have commanded the fort of Gandicota. Some believe him to have been a native of Crishtipad in Cadanul, others of Innaconda in Guntoor, and I have also heard it said that he was born at Chitwel in the Cuddapah District. Yet I have had opportunities of enquiring at all these places and have after all gained no information whatever. Yet his dialect in a few passages renders it probable that Vemana was a native of the South Western part of Telingana, where these towns are situated." In his second edition Mr. Brown states that it is the general belief that Vemana's writings are fully four centuries old, and adds that if the Jungums are correct in making him coeval with the writer of the Telugu Basava Puranam, this would give an era still more remote. According, therefore, to Mr. Brown's first hypothesis, Vemana must have been nearly contemporary with Bacon and Shakespear, according to the second, with Chaucer. If these dates could be relied on, they would show that Telugu has undergone much less change in modern times than English, as the language of Vemana differs little, if at all, from that now in use, but they seem to have no foundation beyond rumour and tradition.

The Abbé Dubois, writing in 1806, assigns a somewhat more modern date to Vemana. "It is worthy of remark," he says, "that amongst the philosophical writings found in this country, where the authors are pleasant and satirical on the subject of religion and ceremonies, there is not one, as far as I know, which has been written by a Bráhman. All that I have seen or heard of are the works of Sûdras. One of the most celebrated in the whole country is Vemana, whose poems were originally written in Telugu, and are now translated into many other dialects. It is affirmed that this philosopher lived within these one hundred and fifty years, and was born in the district of Kadapa, of the caste of Reddi. His poems are interesting and written in a philosophical style."

"It is also material to observe that all the philosophers who have turned the religion and customs of the country into ridicule, are modern authors, at least as far as I have been able to obtain correct information. There may have been ancient authors who have treated such subjects as philosophers, but their works have perished; and I am led to believe that all the earlier works that tended to expose the absurd worship of the Hindus have been destroyed by the Brahmans of late times, in order to arrest the progress of infidelity. They shew themselves equally earnest to discourage the circulation of the modern philosophical writings."

Cavelly Venkata Ramaswami, the greater part of whose life was spent in collecting manuscripts for Colonel John Mackenzie, and who published a small work entitled Biographical sketches of the Deccan poets, makes no mention whatever of Vemana, although he gives some account of no less than 108 poets.

Having recently had occasion to make a tour through the Ceded Districts, I made enquiries about Vemana at various places, but obtained no information which seemed to me of any value, except at Proddatur in the Cuddapah District. The Tahsildar of this place, who happened to be a Reddi, stated that Vemana was an inhabitant of Kondavid, a place near Guntoor, and that he had himself described his birthplace in the following stanza.

వీడు కొండవీడు వీధి పశ్చిమ వీధి
మూల చింతలకెల్ల మొదటి త్రోవ
త్రోవ దెలిశినవారికి దొరుకున యోంలాభంబు
విశ్వదాభిరామ వినరవేమ॥

I shall make some remarks hereafter on this verse, but will at present content myself with observing that there is no such passage in the published edition.

"It is not easy," says Mr. Brown, "to ascertain anything regarding the history of Vemana, which is the personal name of the author and sometimes occurs, though rarely, among the Telugus of the present day. His family name he never discloses; and I hence imagine him to have been a Zungum. The sect of Sudras known by this name are seceders from the common religion; they worship Siva alone, and on embracing the Zungum sect they give up their family appellation, and are then usually called by the name of the sect alone. This creed also corresponds with that taught by Vemana, and this is the only one not satirized by him."

Yet Mr. Brown himself remarks in another place that the following verse is a satire on the Lingum worshippers, a sect who are devoted to Siva.

బూది పూతలేన్న భజముల పొంకాలు
వ్రాలు లింగములును వరుస మతము
లిక్కడఁదగు కాకక్కడఁ దగదెట్లు వి|| B. II. 193.

All this smearing your bodies with holy ashes, these sectarian decorations on your shoulders, and images dangling from your necks; in short, your entire creeds are of avail in this world alone, not in the next.

In his second edition he makes the following remarks.

"It appears that he was not a Junguma, as is indeed shown by his silence regarding their great teacher Basava. But his tenets coincide more closely with those of the Jungums, than with those of any other sect. Vemana, indeed, belonged to no sect." And in his essay on the creed, customs and literature of the Jungums, he gives additional reasons for concluding that Vemana did not belong to this sect. "The Jungums sometimes claim the poet Vemana as preaching their creed, but though he evidently held the Brahmans in detestation, and shows a partiality to the tenets of Basava, he does not embrace the Vira Siva tenets. The insulting manner in which he speaks of the female sex furnishes another proof that he could not be a Vira Siva. He also speaks of future transmigrations: but the Jungums believe transmigration to have terminated."

The creed held by Vemana is shown in the following passages.—

బ్రహ్మమెడదనుచు పలు మారునాడేరు
వెర్రి మూర్ఖ జనుల విధముఁజూడ
బ్రంహ్మ మన్నిటందు పరిపూర్ణమైయుండు వి॥ B. I. 188.

Mad and idiotic are those who are perpetually enquiring where the deity resides. God dwells in all things in his complete fulness.

ఆత్మలోన శివుని ననువుగా శోధించి
నిశ్చలముగ భక్తి నిలిపెనేని
సర్వ ముక్తుడౌను సర్వంబుతానౌను వి॥ B. II. 88.

He who seeks aright the God who dwells in the heart and fixes unalterable faith on Him, he shall attain utter absorption ; he shall be resolved into the universe.

His creed is in fact Pantheism. He identifies nature or the universe with God and teaches that "as every vessel contains a portion of the universe, which after a temporary separation, is reunited to the great whole, so spirits released from the body are again mingled with the deity." B. III. 71.

Mr. Brown remarks that the following passage in Pope's Essay on Man conveys the precise ideas entertained regarding the deity or ruling spirit by those who hold the Vedantist creed.

> "All are but parts of one stupendous whole,
> Whose body nature is, and God the soul ;
> That, changed in all, and yet in all the same,
> Great in the earth as in the ethereal frame,
> Warms in the sun, refreshes in the breeze,
> Glows in the stars and blossoms in the trees ;
> Lives through all life, extends through all extent,
> Spreads undivided, operates unspent."

Thomson expresses very similar sentiments.

> What is this mighty breath, ye sages, say,
> That in a powerful language, felt, not heard,
> Instructs the fowls of heaven and through their breast
> These arts of love diffuses ? What but God ?
> Inspiring God ! who, boundless spirit all,
> And unremitting energy, pervades,
> Adjusts, sustains and agitates the whole."

The terms Maya, Tutvam and Yogi frequently occur in connection with this creed. Maya means illusion and is applied by Vemana to the material world and every thing connected with it, all of which he treats as having no real existence.

> మాయనుచెరసాల, మనసనుగొలుసౌను ;
> భేదమనెడు బొండబెరసియుండు
> యిట్టి బద్ధ జీవికెన్నడు మోక్షంబు, వి॥ B. I. 171.

We are imprisoned in delusion ; our inclinations are as chains ; empty distinctions are the shackles attached to us. When shall be the deliverance from this life of bondage,?

> సుతులు సతులు మాయ ; సుఖదుఖ్ఖములు మాయ
> సంవృతి యనుమాయ జాలిమాయ
> మాయబ్రతుకుకింత మాయ గప్పిస్తివి, వి॥ II. 43.

Sons and wives are a mere delusion, pleasure and pain are a deception ; a family and the affections we feel, are unreal. Thou hast filled this delusive life with empty forms.

Tutvam is the divine wisdom or truth which Vemana is in quest of. The following quotations show what it is, and how it is to be attained.

> నిన్నుజూచుచుండ నిండును తత్వంబు !
> తన్నుఁజూచుచుండ తగలు మాయ
> నిన్నునెరిగినపుడె, తన్నుదానెరుఁగును. వి॥ B. I. 45.

By looking to thee, is wisdom perfected : by looking to ourselves, we fall into delusion; when we know thee, we shall know ourselves.

తను దా దెలుసుట తత్వము
తనకన్యులు బోధ సేయ ధరలో గలరే ?
తను దాఁ దెలియక నుండిన
తనకెవరుఁ దెలుపలేరు తథ్యము, వేమా. వి||

To know oneself is the chief object. Is there any other who can explain this to us ? If we know not ourselves, none can teach us.

The Yogi is the perfected saint, who, having found this wisdom, and being delivered from Maya, is united (Yóga Union) to the Deity.

పగలు రేయు మరచి, భావంబునుమరచి,
తాను నేననియెడి తలపుమరచి,
యుండు వాని నెంచు నుత్తమ యోగి రా. వి|| B. III. 44.

The man that has attained perfection draws no distinctions between day and night, the mind and universal nature, or himself and another man.

మనసులోనివాని మానుగా దెలసిన
సర్వ జనులు వాని యోగి యండ్రు ;
నీవునిన్నెఱుంగనీవె పోశివుడవు వి|| B. III. 46.

He alone among the sons of men merits the title of saint (Yogi) who knows the deity that dwells in his heart; know thyself and thou shalt become the deity.

ఆశ గోసి వేసి యనలంబుసల్లార్చి
గోచిబిగియఁగట్టి కోపమడచి
యాస విడిచెనేని యతడుదా యోగి రా. వి|| B. III. 102.

He who has cut off his lusts, and quenched their fire, who has bound his loins, crushed his anger, and given up every desire—this is the only true hermit (Yôgi.)

Mr. Brown remarks that in some passages the doctrine of transmigration is very strongly inculcated, but he doubts whether these verses were written by Vemana, who has, he observes, elsewhere pointed out the absurdity of this belief. If there are any passages of this latter tendency, they have certainly not been printed, and as far as can be judged from the following and other similar verses, it would certainly appear that Vemana believed in the doctrine of metempsychosis.

పూర్వ జన్మమందు పుణ్యంబు సేయని
పాపి ధనము కాశ పడుట యెల్ల
విత్త మరచి గోయ వెదకిన చందంబు వి॥

If a sinner in his former birth performed no virtue, all his longing for wealth is like seeking to reap when you have forgotten to sow.

పూర్వ వాసన గల పుణ్యాత్ముని కలిమి
యూట చెలమ రీతి నూరు నెప్పు
డెందరికి నొసంగ నెప్పటియట్లుండు, వి॥

The wealth of him who is virtuous and retains a consciousness of his former births shall flow continually like a well spring. To how many soever he gives, he shall still remain wealthy.

Vemana has no respect for the Vedas.

వేదవిద్యలెల్ల వేశ్యలవంటివి
భ్రమల బెట్టి తేటు పడగనీయవు
గుప్త విద్య యొకటి కులకాంత వంటిది. వి॥ III. 155.

The books that are called the Vedas are like courtezans, deluding men, and wholly unintelligible ; but the hidden knowledge of God is like an honorable wife.

He disparages the Hindoo gods and goddesses.

మనియుండెడు జనమెల్లను
చని పోయిన వారి పుణ్య సత్కథలెలమిఁ
విన వలె కన వలె మన వలె
ననిమిషులకునైన దెలియదంత్యము వేమ॥

Let us listen to the histories of those who have lived of old and attentively read the holy legends regarding those who are dead. Let us live accordingly. The gods themselves know not what shall hereafter happen.

He declares all castes equal.

పరగ బొమ్మగుడ్డు బరికించి చూచిన
కులములన్నియందు గూడ బుట్టె
నంద రొకట గల యనన్న దమ్ములేకదా. వి॥ III. 217.

If we carefully observe and examine the universe, we shall see that all castes equally originated therein. Then all are equal. Surely all men are brothers.

He scoffs at the Bramin's pretensions to superiority.

జనన మరణములను సంధ్యత్రాడును లేదు
సంధ్యత్రాడు లేదు జననికెప్పుడు
తల్లిశూద్రురాలు తానెట్లుబాపడు. వి॥

The daily prayers and the braminical cord are wanting both at birth and at the time of death. His mother never enjoyed either of these. And if his mother be a Sudra how can he be a Bramin ?

Although himself a Sudra, he never places himself above a Pariah.

మాలవానినేల మహిమీఁదనిందింప
నొడల రక్తమాంస మొకటిగాదె
దానిలోనమెలుగు వానికులంబేది వి॥ III. 227.

Why should we constantly revile the Pariah? Are not his flesh and blood the same as our own? And of what caste is he who pervades the Pariah as well as all other men.?

He is unsparing in his denunciations of idolatry.

గట్టురాళ్లదెచ్చి కాళచేతులద్రొక్కి
కాసెయులులచేత గాసిజేసి
మొరపరాళ్లకెరగు మొప్పెలనేమందు. వి॥ III. 238.

What can we think of the fools, who bring mountain stones together, knock them about with their hands and feet, and after tormenting them with masons' chisels, bow down to the rugged slabs?

He laughs at the religious observances of the Hindoos.

కుక్క యేకతంబు కొక్కర ధ్యానంబు
గాడ్దె రాగమెన్న గప్ప మునుగు
అత్మమెరుగు భావ మది యేల జేయరో. వి॥

The recluseness of a dog! the meditations of a crane! the chanting of an ass! the bathing of a frog! ah, why will ye not try to know your own hearts!

He ridicules their periodical offerings to the manes of their ancestors.

పిండములను జేశి పితరుల దలపోసి
కాకులకును బెట్టు గాడ్దెలార
పియ్యి దినెడు కాకి పితరయెట్లాగయూ. వి॥ III. 192.

O ye asses! why do you make balls of food and give them to the crows in the name of your ancestors! How can a dung-eating crow be an ancestor of yours.

He points out the folly of pilgrimages.

కొంకణంబుఁ జొవ కుక్క సింహము గాదు
కాశి బోవ పంది గజము గాదు
వేరెజాతి వాడు విడు ప్రు గాడయా. వి||

Though he roam to Concan, no dog will turn into a lion. Going to Benares will make no pig an elephant. And no pilgrimage will make a saint of one whose nature is different.

He thoroughly disbelieves in omens and other similar superstitions.

గద్దె గణము నిద్ర కలలు కోరికెలును
ముదమొసంగు శకున ములునుఁ జెలగు
ప్రశ్నలు పది వేలు పరికించి చూడంగ
నవునుకాకపోవు నవనివేమా III. 9.

Fortune-telling, possession by a demon, dreams of sleep, idle wishes, and pleasing auguries, with divinations of all sorts, turn out true or false, as it may happen. Who can rely on them?

He has a great contempt for hermits and Suniassies.

అకులెల్ల దిన్న మేకపోతులలెల్ల
గాకపోమొనర్యో కాయసిద్ధి
లోకులెల్ల వెర్రి పోకిళ్ళ బోదురు. వి|| III. 137.

Even a goat can attain to such corporeal perfection, as consists in living on leaves; how apt men are to fall into foolish whims.

వేష భాష లెరిగి కాషాయ వస్త్రముల్
బోడి నెత్తిగల్గి బారయుచుండ్రు
తలలు బోడలైన, తలపులుబోడలా. వి|| III. 175.

Saniassies acquaint themselves with particular words and vests. They wear a brick red garb, and shaven pates. On these they pride themselves. Their heads look very pure; but are their hearts so?

It seems strange, amidst these numerous attacks on Hindooism, to come across a passage like the following:

మొదల తవ మతము వదలక
తుదనెవ్వరి మతమునైన దూషింపకయుఁ
పదిలుడయి కోర్కిఁ గోరక
ముదమున జరియించు వాడే, ముఖ్యుడు వేమా|| II. 53.

He who in the first place swerves not from his own religion; who in the second place reviles the creed of no other man; and who cautiously refrains from forming any evil desire. He shall live in happiness. He is the first of men.

The above specimens sufficiently illustrate Vemana's style and manner. It seems therefore unnecessary to quote any of his reflections on friendship, marriage, gratitude, charity, wealth, poverty, debt, sorrow, gluttony, theft, adultery, backbiting and the numerous other topics on which he has touched.

Dr. Pope in his edition of the Abbé Dubois work on the manners and customs of the people of India, remarks that "nothing can exceed the sweetness and rhythm of Vemana's versification." Mr. Brown's verdict on him is that he is "a familiar writer, useful to a beginner, though neither poetical nor classical" and he not only comments on his prosaic versification (p. 32 and 81) but points out numerous instances in which Vemana has been guilty of using false elisions and rustic (gramia,) forms (p. 30, 32, 33, 34, 42, 43, 49, 53, 59, 63, 64, and 79.) Singularly enough no less than two of these false elisions occur in the very verse which Dr. Pope quotes as a specimen of the beauty of Vemana's versification and which Mr. Brown dismisses with the significant remark that "critical exactitude is not to be expected in an author who disregarded eloquence of style."

ఆరు రుచులు వేరు సారఁబు రొక్కటి
సత్య నిష్ట లేరు సత్యమొక్కటి
పరమ ఋషులు లేరు భావ్యండు రొక్కడు. వి॥ I. 122.

Mr. Brown's verdict certainly represents the opinion of all native critics, and Vemana may, without disparaging his real merit, be admitted to stand higher as a philosopher than he does as a poet.

Mr. Brown compares Vemana with Lucian and Rabelais. No doubt, like the former, he laboured to undermine the religion and philosophy of his countrymen by his satire, and, like the latter, had a special hatred of monks and hypocrities. He also resembles both these writers in the profanity and indecency with which his writings are so often tainted. But there is little else in common between them. Lucian and Rabelais are prose writers, and the former is an elegant writer. Vemana is a poet and not a good poet. Lucian and Rabelais are eminent for their wit and humour. There is but little wit and no humour in Vemana's satire.

Mr. Brown remarks that "Vemana has in many passages called himself a madman with a view, we may suppose, to securing himself from the vengeance he was likely to incur by his unsparing satires on Hindooïsm and the Braminical hierarchy." The following is one of these passages,

సగ్గు వారలమని సృష్టి లోపలి వారు
వెర్రి వేమని గని వెరగు పడిరి;
తనకు గలుగు సిగ్గు దైవమెరుంగురా! వి. II. B. 45.

Those who consider themselves decent and reputable, look upon the mad Vemana with astonishment ; as the deity knows his real humility, while he appears only to deride others!

It is remarkable that throughout the whole of Vemana's published writings, there is but one allusion to the Mahomedans. This occurs in the verse beginning

తిరుమలకును బోవ తురక దాసరి గాడు III. 253.

Though a Turk go to the sacred hill of Tripety, he does not become a palmer.

The Hindoos boast that the sacred soil of Tripety has never been profaned by the foot of a Mussulman or a Christian, and although this may not be strictly true, it is not likely that such visits as those noticed in the verse above quoted would have been ventured on before the period of the Mahomedan Conquest. The first invasion of that portion of the Carnatic, in which Tripety is situated, took place in 1310, but the country was not actually occupied until the beginning of the 18th century. So far therefore as any inference can be drawn from this allusion, it seems probable that the Abbé Dubois is right in assigning a comparatively modern date to Vemana.

Nearly all Vemana's verses have one uniform chorus and are written in the Ataveladi metres, but other metres such as the Tetagiti and the Kunda (corresponding with the Ariya Gati of Sanscrit prosody) occasionally occur.

Dr. Caldwell in his Comparative Dravidian Grammar observes that in Telugu the principal grammatical writers and the most celebrated poets have been Bramins, and that there is only one work of note which was not composed by a member of the sacred tribe. The work alluded to is no doubt the Vasu Charitra, by Ramarauz, surnamed Bhattumurti, and though it may be admitted that in a certain sense such writers as Vemana are not authors of note, few will doubt that the influence of their writings is far more extensive than that of the great rhetorical poems. As might be expected from a Sudra, Vemana is fond of using words corrupted from Sanscrit (Tudbhava) in preference to pure Sanscrit derivatives (Tutsuma). One of these, గుర్రము for గృహము house, which occurs in Book II. v. 177 and 192, seems, as observed by Mr. Brown, to have been coined by Vemana and occurs in no other writer. Vemana also uses certain words in a sense which they do not generally bear. Of these Mr. Brown notices పచ్చ yellow, which appears to mean gold in the verse beginning

పచ్చచూచువారు B. III. v. 142.

and తెలుపు whiteness, which appears to mean quicksilver in the verse beginning

తెలుపుమాపుచేశి. B. III. v. 148.

Vemana also uses certain words which appear to be peculiar to the South Western Districts of the Telugu country and which he therefore was likely to use, if as has been above supposed, he was a native of Condaveed. Among these may be named దుడ్డు, to strike, which occurs in the verse beginning

దూర దృష్టి గనరు దుడ్డిన దనుకను. B. III. v. 55.

and బిత్తలి, naked, which occurs in B. III. v. 143. The following may be quoted as samples of his frequent use of Gramia (rustic) forms.

పుట్టింది. B. I., v. 118.
మండేరు. B. I., v. 127.
వచ్చేది. B. II., v. 166.
కొంటు. B. VII., v. 12.
తెల్సు. B. III., v. 85.
తెలియకున్న. B. III., v. 85.

Mr. Brown observes that the expressions used by Vemana are sometimes such as cannot with propriety be translated into English, and that he has wholly omitted some epigrams on account of their objectionable character. Those who penetrate beneath the veil, which the translator has thrown over certain portions of Book III. among which may be named v. 249, 256, 258, 261 and 270, will probably be of opinion that some of the verses which have been retained might, with advantage, have been omitted. Of the number of such passages in Vemana, some idea may be formed from the following notice which is extracted from Mr. Taylor's Catalogue Raisonné of Oriental Manuscripts V. II p. 719.

"6. No. 31, Vemana in four volumes, and a fifth, as a supplement."

"These volumes seem to be the early copies from which the first edition of Vemana's ethics were printed at the College, Madras, in 1829; a thin 8vo. volume, with half pages Telugu, and English translation at the foot of each page. In these MS. volumes, the Telugu is on the left hand page, and the English version is on the right hand. The 5th volume or supplement appears to contain obscene matter, which unhappily mingles with all native ethics; and, as such, was considered to be unfit to meet the public eye."

Dr. Pope observes that the writings of Vemana are extremely popular among the Telugu people. His popularity is, I believe, entirely confined to the Sudras, and even among them, every true believer in Hindooism regards him with much the same feelings as an evangelical curate looks on Colenso. This feeling was very apparent when Vemana was first made a text book in Government Schools. Both teachers and pupils did all they could to evade the order. In some instances the introduction of it into the classes, for which it was prescribed, was postponed under various pretences. In others, the teachers took on themselves to omit certain verses on the ground that they contained profane attacks on their religion. Brahmins, in particular, most cordially detest this author, and, in support of their view, often point with triumphant scorn to the vulgarity of his style and the libertine character of his matter.

I will now recur to the verse quoted by the Proddatur Tahsildar. It may be remarked that, as it stands at present, there are three errors in the metre. Mr. Brown's manuscripts appear to have been full of similar mistakes, which in many instances he has corrected conjecturally. A native critic suggests that three very slight alterations will make the verse scan

వీడు కొండవీడు వీధి పశ్చిమవీధి
మూల చింతకెల్ల మొదటి త్రోవ
త్రోవ దెలియుప్రజకు దొరుకును లాభంబు వి॥

This verse may be literally translated as follows :—

The town is Condaveed ; the street is the western street ;
It is the first road to all the tamarind trees in the corner ;
Those people who know that road shall reap benefit therefrom.

In this sense it may be considered as containing an enigmatical announcement of the town and street in which Vemana was either born or lived. It may however also be intended to bear a secondary or mystical meaning. If so, the sense becomes still more obscure, as the following is the least unintelligible of the various versions which have been suggested to me.

The town is Kylas ; the street is the road to heaven ;
It is the first road to the chief meditation.
Those people who know that road shall reap benefit therefrom.

Since my return to the Presidency I have had an opportunity of examining the manuscript noticed by Mr. Taylor and have found the following verse and translation in the fifth volume (v. 2036 ౨00).

ఊరు కొండవీడు యునికి పశ్చమ వీధి
మూఁగ సేత కెల్ల మొదటి యిల్లు
యరసిచూడఁజూడనది ముక్తిమార్గ మౌ వి||

The village of our body in which the deity dwells is hill town (the head.) Therein his (abode?) is in back street (the spine.) Therein silence is the first house. As we gaze and continually view it, this is the road of beatitude.

The similarity between this verse and the one above quoted is sufficiently obvious. They are probably only two different versions of the same passage. It will be observed that Mr. Brown takes it entirely in a mystical sense, and the verse has probably been omitted for that reason, as may be gathered from the following remark in his preface. "A system of obscure and unprofitable doctrines regarding mysticism is much studied among the Telugus; in such reveries Vemana has indulged at great length, and there his meaning is often doubtful. Of such verses I have retained only a few of the easiest." Mr. Brown remarks elsewhere that the "carelessness of style in this writer often leaves passages thus doubtful, and has led to the erroneous idea entertained among the natives that his verses are all riddles, conveying a different meaning from that which appears." I doubt, however, whether this idea is altogether erroneous, and will conclude this paper by citing two unpublished verses from the manuscript, the first of which seems to me remarkable as containing another enigmatical reference to the time and place of Vemana's birth, and the second, as showing that Vemana was often intentionally obscure, If you drink half and leave half, he will suffer dreadful pain. If you scatter the water he will remain unaffected.

The above is called the spell of Atakáru Durjana Káli. It is in the book called Saparam.

Take a bottle of toddy and a bottle of spirits with raw fish as a sacrifice. Then use this spell:

"Om námo Bhagavatí! Malayáḷa Goddess Mátaṅga [*i. e.* the Par'aiyan goddess] mighty in magic! who delightest in flesh and blood, who usest the rapid curse! let his five senses perish! O Power of Malayáḷa, smite him, smite him!" [here follow some unintelligible magic monosyllables Om! Om! hrím hram &c.]

Go to a potter's kiln and a washerman's hearth, and collect the ashes from each; with ashes from a cemetery: spread all three on the ground, and erect a pentagon*(a)*, and set the image thereupon with red rice, a red fowl, and red sandal wood, and red grain and red flowers. Cut off the fowl's head and pour the blood into a cup, and dip two arrows therein. Then bless the arrows nine times, and with one of them pierce the neck of the image, and with the other pierce its eyes. Then bury it on the north side.

Use the following spell: "O'm, Hrím, Goddess, destroyer of the Universe, with the long tongue*(b)*, who ridest on the buffalo. Om! bhúm! O'm! phaṭ! Sváhá(*c*)!"

The above spell is to be used as follows: get a black goat's milk on a Sunday, and sprinkle it twenty-seven times behind his house, [here a few words are unintelligible,] and your enemy shall lose the use of his hands and feet, and be afflicted with burning fever.

"Om hrím grim trím! Thou who destroyest the senses of others. Blessed Káli, armed with the spear and drum, who

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(*a*) The word *rati*, here inserted, seems to be an error.
(*b*) Káli is painted with a long tongue to lap up blood.
(*c*) The consort of Agni (ignis).—*Ed.*

delightest in red sandal, long-tongued, goddess of ghosts, and mighty in words! O devour, devour my foe!

Húm! phaṭ! Sváhá!"

When you use this spell collect some ashes, utter his name and sprinkle the ashes [some words unintelligible this shall cause his death.

"Salutation to Gaṇeça. I salute the great Bhagavatí, queen of magic. [Here the first paragraph is repeated.]

"I worship the Par'aiyan Goddess who delights in flesh and blood, the dreadful Káṭeri(*a*). Eat! Eat! I hail the awful god Rudra(*b*)."

[Here some words are so ignorantly written that the sense cannot be made out.

Then follow the magic syllables as above.]

Mode of using the above charm. Take the grains called gram, pease, minumulu(*c*) &c. and mix them with rice, take a handful and make them into a paste with running water, and of this paste make an image. This you must place in

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(*a*) 'A forest-goddess whose power lies in inflicting diarrhœa.' Brown's Telugu Dictionary.—*Ed.*

(*b*) One of the names for Çiva. [Rudra, with whose name Benfey (Griechisches Wurzellexicon II, 6) ingeniously connects λύρα for λυδρα=*rudrâ*, appears in the Vedas to be identical with Apollo. Both gods bear the bow. Rudra knows a thousand medicines, and is the best of leeches. Apollo is called ἀκέσιος, ἀκέστωρ etc., and is father of Asklépios. Rudra fares through storm and clouds, and has his hair therefore made up in a mighty knot, whence he is called *kapardin* in the Rig Veda, 1,114,1,5 'he who hath his hair wound into the form of a shell' (*kaparda* 'cypraea moneta') Böhtlingk-Roth, II, 62. So Homer Il. 20, 39 calls Apollo ἀκερσεκόμης, and artists represented him with long, strong hair bound behind into a knot. As Rudra is called *vanku*, 'tortuose incedens' as god of the eddying storm, so Apollo is λοξίας (from λοξός obliquus)—which has nothing to do with the ambiguity of his oracles. As Apollo had a sister Artemis, so Rudra had Ambikâ. Apollo was called Smintheus (Il. 1, 39) from σμίνθος 'mouse', and was represented by the sculptor Skopas with a mouse at his feet. The mouse (âkhu or mûsh, μῦς, mûshikâ) was sacred to Rudra. See Kuhn, Zeitschrift für vergleichende Sprachforschung, III, 335, Kuhn, Herabkunft des Feuers, 202. Pictet, Origines indoeuropéennes, II, 476.—*Ed.*]

(*c*) A kind of bean grown on dry lands (Phaseolus Mungo)—Wilson.

as a region interesting to the naturalist, botanist, sportsman, or climate-seeker. Some of the Engineers of the Irrigation Company, particularly Col. Cotton* and Mr. Buchanan, have also made like explorations. Unfortunately, writing as I am in camp, I am unable to ascertain whether any of these gentlemen, with the exception of Captain Newbold and Captain Beddome, have written any accounts of their excursions. Captain Newbold's observations are, as far as I remember, mainly geological.

The Nullamullays lie for the most part in the Kurnool District, between the Khoondair valley on their west side and that of Cummum on the east; though they also extend southwards into the Kuddapah District as far as the Pennair, and northwards into the Hyderabad territory beyond the Kistnah. This description is, however, chiefly of parts of the range as it lies in the Kurnool District.

The area is thus rectangular in shape in the southern part, having a long north and south axis extending between the two great rivers, a distance of about 108 miles, while it has an average breadth of about 16 miles for a little more than two-thirds of this length from the Pennair, after which it spreads out to the north-east beyond Cummum. Being of this shape, the range consists of a main series of ridges and valleys running parallel to the N-S. axis, whence run off a few lateral ribs and openings east and west into the Cummum and Khoondair low-country respectively.

The average height of the mountains is not more than 2,000 feet above the sea—the two valleys on either side being from 6 to 800 feet—though there is no very great area of ground, even at this height, owing to their peculiar ridgy configuration ; the main valleys being much lower than this, while the ridges run up to between 2 and 3,000 feet. From observations which I have made myself with the aneroid and the thermometer, and from a list of others made by a former officer* of the Irrigation Company, the highest point in the main mass of the Nullamullays appears to be that marked in the map as Mantycondah, which is within 3,000 feet above the sea. Mr. Minchin used to have a bungalow on another ridge, a mile or so south of this, which was unfortunately burnt down last year.

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* I have since heard from Mr. H. Cotton, that Col. Cotton made a thorough exploration mainly to see the capabilities of the country as a sanitarium for the Engineers; and that he looked upon the Brumeshwar neighbourhood as the most suitable.

Mr. Arbuthnot, when Head Assistant at Cummum, had another bungalow on a small plateau of the range, about 12 miles east-north-east (as the crow flies) of Mr. Minchin's place, which, from the list of observations already referred to, would appear to be only 2,341 feet above the sea.

I think the highest mountain in all Kurnool is Byrenconda, part of an outlying range of the Nullamullays to the west of Cummum. On the summit my boiling-point thermometer stood at 205°, which, at the usually adopted rate of 500 feet for a degree, gives 3,500 feet as the elevation ; and from all I could see this must be about the height. Between this height and that of Mantycondah there may be an intermediate one in Eeshwarnacoopum, a flat dome-shaped mountain about 20 miles north-north-west of Cummum.

The range of mountains is traversed by several paths and roads, all of which run generally from east to west, the main ones being the Budwail road in the Kuddapah District and the Nundycunnama road in Kurnool. The rest are mere footpaths, or timber roads, most of the former having been thrown out of use when the two trunk roads were made. In the Kurnool District, the Jotee Conva, Yellagode Cunnama, and the Dorenaul pass are still in good use; while the flanks of the mountains on either side are penetrated for some distance by jungle paths and timber tracks.

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* I believe, Mr Buchanan.

The Nundycunnama road is the main artery of communication between Kurnool and Guntoor, and it is very well laid out; but, for the mountain distance, it is very long (20 miles), and owing to the wildness of the country must generally be done in one march. There is no convenience at all for an European traveller on this road. What little water there is is bad, or at any rate allowed to go bad, through having no proper reservoir, and there is not a bungalow between Cummum and Kurnool, much less any sort of shelter between Gazerpilly and Kistnumshettypilly, a distance of 23 miles on a mountain road. For Natives, there is the dirty water and a Chuttrum about half way across. This resting place is at 1,500 feet above the sea, while the highest point of the road is at about 2,000 feet. There is an enormous amount of traffic by this road; and, looking to what it may be hereafter, owing to Canal and Railway, it might be as well for Government to make it a more agreeable route. There are the good walls of a small bungalow at Gazerpilly, and another might be easily built at Kistnumshettypilly; while a decent well might readily be sunk, or a small reservoir made, at the half-way resting place. It may also not be out of place to mention here, that, for communication between Cummum and Kuddapah, between which places there is a great deal of traffic, it would be comparatively easy and of the greatest use, to open up the old road or path (marked by a double line on the Ordinance Map), which crosses the

Nullamullays between Chintacoonta in the Khoond valley, and Poremaumillah in the Budwail taluq, where there are only about 8 miles of difficult hilly ground (easily to be worked) between the two villages.

The Nullamullays are to a certain extent inhabited, though there are no absolutely fixed villages. The people belong to a tribe or variety, called Chensulahs; or rather, there is about these mountains such a people, dwelling here and there in an unsettled state in the belts of jungle lying along the bases of the hills. I, myself, have only seen inhabited villages of these people in the jungle round the flanks, though I have passed through many other deserted villages on the hills themselves. A tribe, which I saw camped at Bolapilly on the Cummum side of the mountains, considered itself distinct from what it called "Hill Chensulahs." The probable state of affairs may, however, be that these latter people were Yanadis; and that the Chensulahs are an off-shoot from that family, for they are occasionally so called by the adjacent low-country people. The Chensulahs say that the Yanadis always live near villages outside the jungle, whereas they themselves never do so. They are small and weak-looking, but can apparently go through much exertion in the way of walking, and can do without food much longer than the low country native. I had three of these men as guides from a village near Yellagode, who were apparently very stupid, and only knew one road. They did not seem to care about game and had no weapons. Again, on two other occasions, three guides were brought to us. The first, from Busswapoor, was a most intelligent savage. He had a bow and three arrows, was very quick at seeing any game, or at comprehending where we wanted to go, and talked as little as possible, preferring to make signs to us with his hands, or smile or frown as the case might require. He knew all the paths up to a certain point, and then became useless. The next two men were very much after the model just described. One had a matchlock, the other the bow and three arrows.

Generally, the men tie their hair up in a small knot behind the head, and some have the leather skull-cap so commonly worn by shikarries. Any other clothing they have is very scant, and the wonder is how they manage to stand the very severe cold of November and December. They talked to our people in a low kind of Teloogoo, but their own language seems to be different. Their bows are made of bamboo, and a long thin strip of the same material is used for the string, loops of cord being used only at each end of the bow. The arrows are of bamboo and tipped with iron, some of the tips being winged, approaching a barbed head.

The huts met with on the hills are merely ridged roofs covered with thatch, and there is occasionally a low bamboo platform at the bottom on which to lie. I went into one of these deserted huts as a shelter from the sun, but in a few minutes was driven forth by the sudden appearance of countless spider-like insects of a most peculiar form. They had small round black bodies with very long hair-like legs, say from 1½ to 2 inches long, and they came swaying about the place in the most overpowering and airy way possible. At the same time, I became aware of some large fleas, one of which had already seized hold of me before I could rush out of the place.

There is a great deal of game; but I only met with the sambur and spotted deer. The tracks of tigers and leopards are not uncommon: of the former we saw frequent examples, particularly on the banks of the Kistnah, where

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These are not Chensulah, but are left by jungle-cutters, &c., who work on the hills at certain seasons.

old and young animals of the family appeared to have been romping about on the sand only a short time before we reached the scene of their gambols. The wild pig, bear, muntjack (called the goat-antelope here), and neelgai leave their traces ; and the pretty little dark brown Malabar squirrel is not uncommonly heard screaming among the trees. We saw no traces of bison ; but these animals are said to have frequented the mountains many years ago.

The vegetation of these mountains is not generally very luxuriant, though there are little spots here and there in the narrower and deeper valleys where it becomes almost, tropical, and there are evidences of its having been formerly more luxuriant than it is now. The climate of the District is a dry one, and, for some months before the rains set in, fiercely hot ; while the nature and position of the rocks composing the mountains render them incapable of holding water at or near the surface. Consequently, vegetation has not much chance of holding out in any richness ; and the systematic clearing of the jungle, without, until lately, any restrictions, has not tended to make this any better. Throughout the rains,—that is, from May until November—there is a great effort on the part of nature to clothe these hills with rich jungle, and from that time until the beginning of February they are quite green with vegetable life. During this latter period, however, nearly all the water which has fallen is being used up, or absorbed into the vertical fractures and convoluted foldings of the rocks. Then the hot and dry season begins, when the hills become brown and yellow with the dried-up bamboos and great spreads of mountain hay, while most of the trees are shedding their leaves previous to their dead life of the hottest months ; whereupon the fires begin and there is soon exposed a great mass of tolerably bare mountain land.

Still, there are areas which would seem not to be entirely dried up, where there are somewhat extensive tracts of forest land; and it is to these I should wish to draw attention further on, as I detail how we saw them during our several excursions.

The rocks are Quartzite (altered sandstone) and Clay-slate. Generally speaking, they are arranged thus:—a great series of clay-slates resting on or overlying a great series of quartzite, the latter occupying the western side of the mountains, the former the eastern. They lie in a series of great folds or undulations (sometimes almost reduplicated), with a general dip to the eastward, so that occasionally, we have the older quartzites rearing themselves up in the higher parts of the mountains, the slates, which once overlaid them, having been denuded; while the lower parts of the hills and the valleys, which have been protected, still have the clay-slates as their foundations. At the same time there are thin series of slates intercalated in the bottom quartzites, as there are also thin bands of quartzites in the clay-slates, thus giving to an ordinary observer the idea that the mountains are a confused jumble of the two kinds of rock. Still, there are the two distinct features of the Nullamullays being slaty on the east side of a line drawn through the highest ridge, running north and south, that is, through the Hoblum Pagoda (south) and Nimuljeery Conda (north); while to the west they are of altered sandstones. And one effect of this is that the jungle on the eastern half is thin and poor, except in the bottoms of the valleys; while there is tolerably thick forest on the western side. At first sight, one would wonder at this, the quartzites being such hard intractable rocks, while the slates are so much softer.

Perhaps much of this barren character of the slates may be owing to their being such bad holders of water. In the Nullamullays they are so fractured in a nearly vertical way, that all the water sinks down rapidly, until it is caught up by the quartzite intercalations in the slates, or by the quartzite series below ; and this last may also be a reason for the fertility of the quartzite area, as most of these rocks would fetch the water up to their outcrop by means of their undulations.

Regarding the diamonds and the lead of which we occasionally hear as occurring in this part of the Kurnool District, there is not much to be said. A peculiar band of silicified and calcareous rocks is interbedded with the clay-slate series, and it is in these that traces of lead and copper have been found. There are, or were, two mining regions in the mountains ; one in the Kuddapah District, the other near Busswapoor in Kurnool. The first certainly seems to have been the best and most extensive ; but in both cases I believe they have been thoroughly worked out by the old Native rulers of the country. Mr. Wall, the late Government Mining Engineer, has written papers on the mines in this Journal ; and the results of his examinations may be taken as a close approximation to the condition and prospects of these metalliferous regions.

The diamond-mines also used to be near Busswapoor; but they have been long deserted, and are now grown over with bamboo jungle. They generally consisted of alluvial washings. The gravel and sand of an alluvial deposit which filled up a small valley to the east of Busswapoor used to be dug up out of pits and washed and examined for the precious jems, pretty much in the same way as the diamonds were worked in the village of Chenoor, a few miles north of Kuddapah, in the neighbourhood of which, by the way, it is said that the famous Golcondah* mines were situated.

To the east of Busswapoor traces are still left of the diamond-bearing rock (quartzite) lying unconformably on the low quartzite hills, and it was from the debris of this among the gravels that the diamonds were obtained. In some cases the rock appears to have been worked *in situ*; but the gravel washings were evidently the favorites.

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* There are no diamonds found at Golcondah near Hyderabad.

Before concluding this sketch of the geology, it may be as well to notice the occurrence of stone implements in the alluvial deposits lying round the bases of the mountains. I have found only one rude and much-weathered implement, of the oval shape, on the elevated ground; but they are common enough at some points on the plains immediately below. They generally lie scattered about over the surface of the ground, or in ploughed fields, and in such cases must have evidently been in a very superficial alluvium: or else, as is most likely, they are from a very superficial deposit of gravel, the remains of which may be seen here and there in the small spreads of soil and gravel left standing over the general level. The first locality lies immediately north-east of Bolapilly, 16 miles north-west of Cummum, where I found numbers of undoubted weapons in a freshly-ploughed field; and it was on the low ridge, north-east of this village that I found the worn-specimen mentioned above. Among those from the field was one which shews very distinctly the "cone of percussion," or peculiar surface of fracture common to many of the British and Continental implements, said to have been produced by the original blows given by the manufacturer to the chipped stone. This specimen is also remarkably like the Danish and Esquimaux "Scrapers," figured in Lubbock's 'Prehistoric Times.'

Again, about 6 miles south of the last locality, in the Aukiveed valley, I found more traces of weapons, and 15 miles further south-south-west at a point about west-north-west of Kistnumshettypilly, there were numerous very good specimens lying scattered about in the fields, one of which is a very flat oval with a beautifully sharp edge all round, and seems to have been a cutting implement or a scraper.

On the western side of the mountains I also saw many traces (Mr. Foote when with me, on one occasion picked up a fine weapon a mile or so west of Roodrar, and saw many others); and I dug out in January last from the bank of the Madaypoor stream, near Busswapoor, two weapons (one a very perfect spear-headed form) at 7 and 8 feet, respectively, below the surface soil. These last were in layers of very coarse gravel and shingle.

As yet, I can say nothing definite about the age of these implements; but it is not a great stretch of imagination to say that the men who used them must have lived on these Nullamullays, or their flanks, when the Koondair and Cummum valleys were under water; and these valleys are now, as I have said already, from six to eight hundred feet above the sea.

From what I have said about the geological structure of the Nullamullays it will be seen that the water supply is on the whole a poor one. For some two or three months after the rains, of course, there is plenty of water; but after that it gradually disappears, and only reappears at rare intervals, when small streams flow for some distance down a few valleys and ravines; and these are generally at outcrops of the quartzite, above which are more or fewer series of slates. Most of the watering places will be found noticed in the second part of this paper; but I have no doubt that wells might be sunk with advantage in many places, particularly wherever there is a synclinal, or hollow saddle of undulation, among the beds of rock.

The western base of the hills is also peculiar in having four or five localities whence issue springs of slightly tepid water.

Those which I have seen are two in number; Mahnundy about 8 miles east-south-east, and Vankarum 13 or 14 miles north-east of Nundial, and there are traces of others along the same line.

Mahnundy is the famous spring, and is, at certain seasons, the resort of thousands of people, who take part in the religious festival of washing themselves. A pagoda has been built over or around the spring, the shrine, or most sacred place, being built immediately over it; while a small tank, about 30 feet square and 5 feet deep, has been built to receive the water, as it passes away. The water is beautifully clear and limpid, and of a faint blue colour, showing the sand and stones at the bottom of a marvellously clear grey with the edges quite irridescent in the sunlight. It is seen quietly welling up from the bottom in one corner of the tank; and thence, outside of the pagoda, it rushes in a fine stream to the Nundial tank. The temperature of the water being about 89°, it is apparently warm in the cold weather, and cool in the hot; and, altogether, Mahnundy Pagoda tank is the most delicious bathing place in the District. I saw it first in April 1865 at 11 o'clock in the day, and the sun overhead could not keep me out of the beautiful water.

The other spring is a much smaller one, having also a pagoda and tank which are now in ruins; but the supply of water might be much improved if the tank were cleared out. Both localities are, as might be expected from the supply of water, perfect oases of vegetation in this dried up part of the district. The trees are magnificent in size and foliage; and there are a few which are not to be seen in other parts, including the grand and beautiful Sago Palm. These watering places are also great resorts of tigers and deer.

A few remains of old tanks are to be seen around the foot of these hills, which are worthy of notice; for in one case, at least, the bund could be repaired without any very enormous expense, and the country below it again made the fertile garden it is reported to have been in former times. To the east of Yellagode there is the old bund of a large tank, the bed of which is now covered with forest. This must be a very old tank, and there are evidences that others with their cultivation existed between it and the above village. In fact, all along the foot of the hills in the Khoondair valley there are traces of old and discarded tanks, some of large area. In the large valley inside the mountains, whence the Nundial stream flows, I also saw the bund of an old tank, now overgrown with forest.

The particular instance I wish to draw attention to, is that of an old tank which used to lie inside the outer low ridge of hills, 4 miles south-east by south of Roodrar, on the road to Diggoo Hoblum. There is no delineation of this tank on the map, but it is plain enough, when one stands on the long bund traversing the stream as it runs across a depression in the Roodrar ridges. The bund is about 30 feet high and nearly half a mile long, and apparently only breached at the stream. The people about tell some wonderful stories of the way the water used to lie back behind the ridges so as to form a large lake, and say that the cultivation, of which there is scarcely any evidence now, was very extensive.

The Nullamullays are, like most other low ranges of highland in India, more or less feverish at certain times of the year*. The feverish period appears to be that which comes on after and during the rains (from May to November); though the people in the low-country alongside will tell you that they are always feverish in some degree, and that the cold months are the most feverish ones. My people have in some cases had what they called fever during the cold months; but this was merely a severe cold brought on from their not having fed or clothed themselves properly.

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* Captain Beddome gives a more favorable account :—"The higher portions of these hills appear to be healthy all the year round. Mr. Arbuthnot, Head Assistant Collector of the District, has a bungalow on a part of the range near Cumbum. He informed me that he has been on the hills at all seasons, and has never caught fever. The natives do not appear to suffer from it, &c."

Up to the time I am now writing (April), I have not heard of any of ourselves or our people having been laid up with fever.

Mr. Minchin generally used to live in his bungalow at Mantycondah through the hot weather, and on into June when the rains had commenced; and I do not think he, or his family, were ever attacked. Of course, it would not be a sensible proceeding for any man to sleep in the forest valleys, if he could help it; though Mr. Thomas and I had generally to camp in such places during our two trips. I may also mention that I drank water at nearly every place (many miles distant from one another) where it was running and clear, and our people did so too; but Mr. Thomas had the usual prejudice against jungle water, and would not touch it, except in two cases, where he supposed for some reasons of his own (just as I did!) that the water was innocuous.

PART II.—DETAILS OF EXCURSIONS.

Having thus described these mountains generally, as far as they are already known; I shall proceed to give a short description of each of the excursions we made, as that will perhaps be the shortest way of giving the results, as far as they may be useful to any future tourists, or interesting to the general enquirer.

It will be seen that one object of this paper is to bring into more notice the forest capabilities of the range and its adaptability as a small sanatarium for the residents of Kurnool and the district; these being, as far as I can see, the present main ways of turning the mountains to account.

The last Report of the Conservator of Forests shews that the forests are worked considerably for timber, and may be made much more productive, while there is a large surplus revenue to the credit of the department; and with such an immense area of country to the westward (where there is scarcely any timber) needing wood more or less for its many requirements (the railway more especially), there is little doubt but that the forest land, with very little more expenditure and care, may be made much more valuable.

The desirability of a sanatarium is not a matter of such great importance now that the hill-stations of Southern India are more within reach of Kurnool through the gradual approach of the railway; but there will still be some people who are necessarily left during the hot weather in the station or district, and it is for these that a few bungalows with their gardens, perched upon the mountain scarp opposite Yellagode, would be very pleasant places of retreat.

Cummum and the Yellagode Cunnama.

Mr. Foote and I made our first expedition into these mountains from Cummum on the east side, by the Bolapilly valley in December 1865. Cummum is famous for its splendid tank, an extensive spread of water dammed in behind one of the outlying ridges of the Nullamallays. This ridge has two narrow rifts or passes in it, through one of which the Cummum river used to flow; but across these, and especially across the river pass, great bunds have been built. The calingula is built in the smaller ravine. When we were there in December, the waters were getting low, but even under this disadvantage the tank with its low hilly islands, was a most lovely feature in the scenery. It is a much nearer approach to a lake in size and physical features than any other artificial piece of water I have seen in Southern India, and I have seen most of these. As one stands on the main bund, the picture presented is that of a lake partially studded with conical and ridgy islands, and bounded by hills, with the grand Byrencondah in the background.

This mountain (3,500 ft. high) is a difficult one to get at and ascend. We got at it from the village of Aukveed on the west side; but, though starting about seven in the morning, we did not reach the summit until midday. In the evening we got down to the low ground in about an hour, by a path on the Cummum side; but this is such a frightfully steep descent that we had generally to hold on by bushes, or long grass, and occasionally to proceed in a sitting posture, lest we might slip away into some of the ravines alongside. The best way to go up by this path would really be that of harnessing oneself to a pony, and driving him up in front.

Both the tank and the mountain are well worthy of a visit, but unfortunately there is a good deal of inconvenience and exposure to be undergone before it can be accomplished. Cummum is a completely isolated town, or large village, and there is only one decent residence in it; there are two other houses, but they are wretchedly tumble-down and very small.

From Bolapilly, we followed what is called the Yellagode Cunnama, or pass, which leads across the Nullamullays to the village of Yellagode in the Khoond valley, for about half its distance; and, then, some months afterwards, I completed my examination across by entering on the west side from the latter village, and getting as far as the stream we had stopped short at in December. The valley leading up to the pass was quite green and luxuriant with moderately sized trees, the forest being so thick that we could scarcely get a sight of the hills, or headlands, on either side. There were numerous small teak trees (say 30 feet high) scattered all through this forest, especially alongside of the stream, but all were badly grown and chiefly from stumps, The Goomer Teak was very common, as also the Nullamudday; and there were occasional open glades with very large trees in the midst and all round, while belts of bamboos were very common over the forest.

In one of these glades we saw a curious object sitting out in the open, beside the dead embers of a fire, which turned out to be an unfortunate Chensulah, who was utterly unable to walk on account of a fearfully enlarged abdomen, probably the result of a diseased spleen. It appeared that his tribe had left him there with a little food and fire, until some providential means of transport should be found. And so it happened; for on our return in the evening the man was gone, and, some miles further on, we found him sitting on the roadside, near the encampment of the tribe, having been brought on by one of the wood-cutter's bandies. We also met another of these people, a miserable half-starved specimen of a man, lying down with his hungry dog beside the watering place. This man certainly seemed to be taking no thought of the morrow as to what he should eat, until he saw us, when he began to pat his stomach and make other signs for food. He subsequently turned up in a mysterious manner at our breakfasting place where he got something to eat, which I suppose carried him on to his people. He had no apparent means in the shape of hunting weapons for obtaining food.

These people are supposed to feed on almost anything, vegetable or animal, which they can get.

After getting out of the valley and rising up on the elevated ground of the plateau between the Bolapilly and Brumeshwar valleys, the jungle becomes thinner, with trees that are not of much value. But the path does not follow the higher part of the plateau; and the ground to the south or towards Brumeshwar seemed to be well-wooded.

From the Yellagode side I worked in February, and then the jungle had become much more open, owing to the burning of the long grass, and the trees shedding their leaves; but this part of the range is not at all well-covered with forests, except just in the depths of the stream valleys. The Yellagode Cunnama does not rise above 2,250 feet. On the west side of the mountains, it is evident that there was a great track, from the rut which has been worn in the middle of the path by the dragged timber. There are two watering places on this road, about half way across; but one of these was drying up rapidly in February. In December there was a large dark pool of water in this place and plenty of shade from the trees; now, with the water nearly dried-up, the forest was tolerably open. This apparent opening or clearing of the forest is due to the wonderful falling of the leaves as the hot weather comes on, the ground being quite yellow and crackling with the debris of foliage, among which are principally to be recognized the leaves of the Teak, Goomer Teak, Bauhinia (gigantic creeper), and Bamboo.

The Goota Cunnama.

In January we made an expedition by the Goota Cunnama pass, which used to lead across the mountains from Roodrar in the Khoondair valley to Kistnumshettypully on the Cummum side. We hoped to have done this in one day, leaving Roodrar early in the morning and walking across by night-time. But when evening fell we were not half way over, so we had to make ourselves as comfortable for the night as possible on the side of the mountain, and manage through the next day with a bottle of warmed-up tea and a couple of biscuits, finally getting into camp very tired and hungry at about 5 P. M. Our ten coolies behaved very well. They, poor creatures, after their one meal the first day, had to manage as well as they could on three of our cheroots and water.

This path is now quite out of use and cannot be traced along a good part of its old route, while it is not ridable, except on the eastern side of the Nullamullays. For some miles on either side it is used as a timber track.

About 6½ miles north-east of Roodrar we got into the broad valley of the stream which flows (during the rains) down to the ruined tank south of the same village, and there we found a belt of forest land something like, only not so thick as, that of the Bolapilly valley ; with, however, very decided belts of small teak trees growing along the banks of the stream and its tributaries. The hot weather had not commenced, the time when the teak begins to cast its leaves, so that at a distance the belts were quite distinct through the forest with the green of the great leaves of this tree. Here also, the teak is generally grown from old stumps, which must have been cut down some years ago, as the present trees are mostly 20 to 30 feet high, and about a foot in diameter ; the old trees having been from 5 to 6 feet in circumference. All the rest of the hills about this valley was covered with the usual jungle, amongst which were good-sized trees of Nullamuddy, Chiriman, Jitigi, Billoo, Yippa, and Goomer teak ; while there was a good deal of bamboo. There is a great north and south timber road down this valley.

the "Veda language" transcribed according to "the Jonesian orthography." He cites three passages of the Rigveda, one from each volume of Max Müller's edition. It will be enough to reproduce only one, the second, and Mr. Taylor's remarks, which apply to this in particular as well as to all three.

We read in volume II, page lxxxi:—

Tattrâisha sukre prat'hama
Yo játa prat'hami sana khándevò devan kratunà parya b'húshat—

Yasya sushma dodasi ab'hyasetàm nṛṃnasya maha sa janasa danda—
Yah játa ráva prat'hamah—manakhan—devah—devan—
Kratuna—pari—ab'hushat—
Yasya—sushmat—rodasi dati—ab'hyasetàm—nrinnasya—mahā—sah—janasha—danda.
Volume II, p. 469.

Then follows the passage from Max Müller's Rig Veda, v. III, p. 949, and Mr. Taylor goes on to say: "It will thus be seen that the composition is evidently designed for measured intonation by more than one person; and with recurring *alliteration* (as to *words* and letters) of a peculiar kind."

I can only gather two things from these quotations, firstly that Mr. Taylor cannot properly read the Devanâgarî characters, and secondly that he does not understand a single word of the passages which he quotes. In order to prove the first charge let us go over these lines, which, as they stand, are just as little Sanskrit as Tahitian. In the first line we have Tattrâisha for tatraishâ, sukre for sûkte, prathama for prathamâ; in the second, prathami for prathamo, sana khándevo for manasvân devo, devan for devân, parya bhúshat for paryabhûshat, and after jâta eva is left out: in the third line sushma dodasi for çushmâdrodasî, nrịṇnasya for nrimṇasya, maha for mahnâ, janasa for janâsa danda for indrah : in line 4 játa for jâtah, ráva for eva, manakhan for manasvân, devan for devân : in line 5 rodase dati for rodasî iti, nrinnasya for nṛimnasya, mahā for mahnâ, janasha for janâsah, danda for indrah. Now it is very curious that all those letters or groups of letters, which Mr. Taylor mistakes one for the other, kte and kre (क्ते and क्रे) ma and sa (म and स) sva and kha (स्व and ख) da and i (ड and इ) ra and e (रा and ए) mî and mo (मी and मो) bear in Devanâgarî some resemblances to each other. This fact, I think, strengthens our hypothesis regarding the origin of these little mistakes.

Now for the second charge, Mr. Taylor does not seem to be aware that the words "tatraishâ sûkte prathamâ" do not belong to the text of the Veda. They are the commentator Sayaṇa's and mean : "Here follows the first verse of the hymn."

Secondly, as Mr. Taylor speaks of "the alliteration (as to *words* and letters) of a peculiar kind," it appears that he was quite ignorant of the fact that in this, as well as the two other passages, he has copied the same verse TWICE OVER, first in the Samhitâpâṭha, where the words are connected, and next in the Padapâṭha, where the words are exhibited separately. Sapienti sat!

Another class of mistakes occurs in the spelling of the names and Sanskrit words. We find quite absurd and ungrammatical forms, like Brahmam for Brahma (base Brahman) karmam for karma (base karman), pátam (neuter) for pâda (masc.) vâtam (neuter) for vâda (masc.), Bhattoji dikshada for Bhaṭṭojîdîkshita, kuvalâiyánantam (neuter) for kuvalayânanda (masc.), Appâya dikshada for Apyaya dîkshita etc. On the first five pages of Vol. II, we counted large cheetah and its young one, as they had walked before us along the road, right up to and beyond the cultivated fields and where the men were at work clearing fresh jungle.

Mantyconda.

By the end of February, the grass had become so long and thick, and the jungle was still so full in foliage north of the Nundycunnama pass, that I almost gave up hopes of being able to see my way about sufficiently for my work. In some places, the grass was nearly up to my shoulder, and it was almost impossible to find the smaller paths. Indeed, the village shikaries and guides from the low-country strongly advised me to wait until the jungle fires should be over, as they, themselves, found it difficult to distinguish any of the paths, except the well-marked ones. However, just as I was beating a retreat, I was joined by Messrs. Thomas, Latham and Ferguson, when we thought it better to make a trial trip.*

Mantyconda is an inconvenient place to get at from Kurnool. First of all, Nundial is to be reached, a distance of 48 miles, with a ghaut, and with no convenient resting places; and then there are still 20 miles to the hill-station, 12 of which are in the low-country. About 8 miles north-east of Nundial, there is a village called Singwarum (not marked on the map) which is the nearest place on that line to Mantyconda.

We got away from this village about 7 A.M., with 30 coolies, and in an hour and half reached the foot of the ghaut at a point north-east of Singwarum, where there is a deep well sunk in slates with bad and dirty water at the bottom. From this point, a ghaut has been made up to the bungalow,† which, for the first two miles, is a most aggravating series of nearly horizontal zig-zags, and one feels naturally inclined to turn up the bed of the nullah every now and then to cut off a few of them. All this zig-zagging can, however, be avoided, by toiling up the timber track, as it ascends tolerably directly to the longer and more gently-rising road. This, from the top of the zig-zag, leads up a long valley, without any watering place, to the foot of the little hill on which was the bungalow ; and the whole ghaut occupies in its passage about three hours. The usually adopted road at present, is partly the timber track and partly the made ghaut, the people having, as they generally do, adopted so much of either as made the road best suited to themselves.

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* Mr. Sheffield, the Assistant Conservator of Forests, was with the Collector, and gave us much useful and interesting information concerning the forest.

† Mr. Minchin's bungalow in ruins.

This is evidently a much used timber road, the village of Singwarum being a depôt for the material, which is mostly brought from the interior of the mountains to Mantyconda, and then dragged down. The jungle is thin on the slope of the ghaut, but it thickens out somewhat in the long valley leading from the first and steepest part of the ghaut up to bungalow.

Mantyconda is on the western edge of the mountains, a little inside ; and from it one looks out over the Khoondai valley, though there is not much open view in this direction, owing to the intervention of neighbouring ridges. But, to the north, south, and east there is a perfect sea of green-wooded jungle on roughly undulating highland. Perhaps much of this greenness of the jungle disappears in the hot weather; though, from what I saw a fortnight afterwards, I should think that a good part of the verdure remains all the year round. The bungalow-hill is bare of trees and covered with coarse grass, but all round and below is jungle with a good deal of bamboo.

The timber road of the ghaut runs round and past the hill, and by following this, or taking a shorter path direct from the bungalow, the well or watering-place is reached, some 300 feet below, on the eastern side. A well has been partly sunk and partly built up on the out-cropping edge of some quartzite beds, but the supply of water seemed very small at this time, and it was dirty looking. Perhaps, however, both the quantity and quality may be improvable by clearing out the place. At any rate, beside the well, a large garden has been cleared, railed in, and planted in the forest; and though it is now much overgrown with jungle and partly destroyed, we saw mangoe lime and peach trees growing very well, and even gathered a few roses and some hard and diminutive peaches. There were also the unmistakable marks of a large tiger, near the bony fragments of a sambur which he had been devouring in the middle of the garden.

Hence, we wandered for some miles eastward, and saw some splendid forest land full of fine timber trees, as Nullamudday, Chirimaň, Yerramudday, Jitigi, Goomer-teak, some Tumki (Blackwood), and a good deal of Teak. A great many felled trees had been most ruthlessly cut away to give the small bauks (about 10 to 12 feet long), which alone the wood-cutters can carry out, owing to their small means of transport. They will cut down a splendid Nullamudday with a clear stem of 30 or 40 feet, 3 or 4 feet from the base, leaving a good stump of timber; and then cut the great trunk into two logs, thereby wasting a lot of wood where it has been cut across. There is also a good deal of fine and large bamboo in this forest basin to the east of Mantyconda.

Occasionally, in wandering along here, we came on more open tracts of forest in which the teak tree is prevalent, but, as is usually the case all over these mountains, grown from stumps. Here, some of the trees are good, that is, they are from 1½ to 2 feet in diameter, and 40 feet high. They are seldom straight-grown trees, however, being much twisted and gnarled; and they are horribly mutilated by a most relentless creeper (Bauhinia), which is the bane of the more elevated tracts of forest.

The Bauhinia is a very pleasing adjunct to the scenery in some respects, with its long and festooning snake-like trunks, and beautiful, large, bilobate leaves. The old stems ramify about, very much in the way a number of the new "Pharaoh's Serpents" might do, if they were started from one point. They are seen stretching through the forest along the ground, or up to the highest twig of a tree, or right across the fork of two great branches, or coiled up the trunks, or looping in festoons from tree to tree, and covering every thing with a most luxuriant foliage; until trees die, are split up or are finally dragged down by the superincumbent weight of this gigantic parasite. It is really a cruel picture, that of these grand trees, utterly ruined, and rearing their dead or leafless branches out of the midst of the rich foliage of the creeper. The young shoots have a most eager tendency to lay hold of any unfortunate tree, stretching themselves up for 20 and 30 feet at a time; and when a tendril has once wrapped itself round a twig or leaf, it requires some force to unwind it.

The leaves of this creeper are largely gathered in the forest, and sent into the low-country to be used for leaf-plates, for which they are much prized; and the bean, enclosed in a large pod of very hard material, is used as food by the Chensulahs. On one occasion, we met the native contractor with his party of coolies coming up from the low-country to gather the leaves, and at another time, I met some Chensulah women gathering the fruit.

Having wandered about 4 or 5 miles east of the bungalow through this sort of jungle, without, however, coming to a second stream (as it turned out afterwards, we were just at the water), our guides objected to go any further, any paths we met being reported to lead nowhere, or, as they put it "that road went into the forest and came back again;" and as, in a subsequent excursion to be made about a week hence, we were to return by Mantyconda, we turned back on our path.

On our descent by the same ghaut, there was plenty of experience of the burning grass on the side of the mountain, for the villagers had apparently fired it then, instead of before our ascent, as they had been ordered to do. At one point, as the fire came roaring and crackling up the face of the hill-side, we had to run through it, as it flared along on each side of the path with its fearfully scorching heat.

The Brumeshwar valley.

In the meantime, and while preparations were being made for our more extended excursion into the interior of the mountains from Nundial, I went off to Yellagode and thence worked into the mountains by the Yellagode Cunnama, and up into the Brumeshwar valley. To get at this last, I had to pitch a temporary camp about 8 miles east of Yellagode, near the site of the deserted village of Boogapully. There is low-country even beyond this for a couple of miles or so, until a pool of running water is reached at the foot of the ghaut; and then the timber track (or rather "slip" in this case) rises very steeply until an intermediate terrace is reached.

Looking east from Yellagode, the mountains, for about 4 miles, appear to consist of a long horizontal plateau, at the southern end of which is the little irregular mass of Mantyconda, and to the north the saddle, over which the Yellagode pass leads to Bolapilly. The path to Brumeshwar leads over this apparent plateau.

As I rose from the intermediate terrace, mentioned above, towards this plateau, I really felt that morning something of the " sweet, half-English, Neilgherry air," as the fresh breeze swept past me; but this was doubtless owing to there having been a heavy shower of rain three or four days previously, and to the fact that the interior of the mountains since then had been covered with a light cap of clouds during the night. From the terrace,the path ascends rapidly to the seeming plateau, which turned out to be the tolerably level crest of a long slope rising up from the Brumeshwar valley; and when I stood there in the fresh breeze, looking over the plains, I thought how much more preferable a site this would be for a bungalow than Mantyconda, if we could only get water.

At present this crest of the Brumeshwar basin is covered with jungle of bamboo and tolerably large trees of the kinds usually found on the Nullamallays; and it is about 2,700 feet above the sea, or nearly 300 feet lower than Mantyconda. Descending gently to the eastward towards the Brumeshwar valley through a tolerably open jungle with large trees, and then getting into the head of a narrow valley, I found myself (in 20 minutes, from the top) beside a stream of water.

This little valley deepens and narrows, and the stream becomes a brook of clear running water, quite charming to look at in these generally dry mountains, whose stones are covered with ferns and moss, and which is buried in a tolerably close growth of great trees and bamboos.

There are very large mangoe trees, as is usually the case in these water valleys, only that here they are more numerous. The bamboos are very fine, many of them 4 and 5 inches in diameter at least; while the sago palm shows its beautiful plume of leaves and ropy droops of fruit here and there amongst the other trees. The Chensulah guides told me that water runs here all the year.

Then I got down to Brumeshwar, the site of a ruined pagoda and small tank, in a wide valley of fine timber jungle. Between the stream just described and the pagoda, there is an open bit of forest in which the teak trees must formerly have been very good; some of them were 7 and 8 feet in circumference at the base, and there were stumps of larger growth. Those in the open appear to have grown much better than what I have hitherto seen.

The point where I found the flowing stream was at 2,300 feet above the sea, 400 feet below the crest; so that the conditions are pretty much the same as those of Mantyconda and its watering place. Still, there is much superior water at Brumeshwar, and more space to move about in, on the crest, than on the little hill of Mantyconda. There are also admirable sites between the latter hill and the plateau north of Brumeshwar for three or four bungalows, with some driving and plenty of riding ground.

There is a good deal of timber dragged to the crest of the Brumeshwar ridge from the wide basin on the east side of it, and then slipped down by the ghaut, to be carted to Yellagode. At the foot, near the stream, I saw several bauks of the dark brownish-red Nullamadday and the pale yellow or white Chiriman timbers, which were then being carted away.

The Cotta Cunnama.

Early in February last, Mr. Thomas and I started for a five days' excursion to the interior of the Nullamallays. There being no fixed villages, we were obliged to take every thing with us necessary for food and shelter, except water, which we could only depend upon at certain points; and for these thirty coolies were required though in a subsequent trip we reduced this number somewhat by using the "canát" of the beechobah (rigging it up in the form of a merchant's tent) instead of the whole tent, as on the present occasion. We had one guide, a Chensulah, who came from near the village of Busswapoor, where his tribe was dwelling at this time. He was a very sharp, willing and intelligent man, and was armed with a bow and arrows. Should any future excursionist want a guide, let him send for "Gurrupoo" of Busswapoor.

We started from Nundial, entering by the valley whence the stream of that village flows, and this brought us on to the Cotta Cunnama. This broad valley is like the others of the Nullamallays in being well-wooded with the usual trees for about two miles east, when the forest becomes thin and open, up to the foot of the Nimuljeery ridge; though over this open country there are frequently very fine specimens of the Yippa. This tree is not used as a timber by the people on account of its hardness and the difficulty of working it, but it is a very valuable and handsome wood. Mr. Sheffield, the Assistant Conservator at Nundial, tells me that the bark only of the Yippa is used by the people for making rope, but that it is a capital timber, well suited for railway sleepers, and that he can float any quantity of it down to Kuddapah by the Khoond river at the proper season. Except in this inner part of the mountains, the Yippa is generally most mercilessly cut down and pollarded by the people over the whole of the Kuddapah and Kurnool mountains. This is more particularly the case on the Yerramallays, which flank the Bellary District, where every shrub and tree is wanted as much as possible to shelter and either attract or keep any little moisture that may be formed.

We camped in the broad valley, at the usual watering place on the Nundial stream for the night. Here, the water is rapidly drying up and there must be scarcely any left a month later for the numerous wood and hay-cutters frequenting this part of the mountains.

There is a very large quantity of coarse dry grass carried out by this road in huge bandy-loads to be used for thatching, but it seems not unlikely that the finer grass may eventually be carried out for fodder. Our horses had no other grass on these hills, and they appeared to eat it with avidity. It would also seem to be splendid food for cattle; perhaps, too, it is owing to the fact of their being let out to run over a hay of this kind, that the mountain-fed cattle of this and the western parts of the Nellore and Guntoor districts are so well conditioned as they are reported to be. Further north, on the western side of theseNullamallays, about Atmacoor, &c., there is an immense tract of jungle-grass-covered country, farmed, some years ago, by the late Captain Nelson, upon which great herds of cattle are allowed to feed. The future canal boats would be a good means of transport for this resource of the mountains, if it were ever used for fodder.

The open ground on the west side of Nimuljeery ridge is extensively covered with fine yellow hay, and is thus very dry and bare-looking. Even the generality of trees are quite leafless now, the Yippa being the only one in a flourishing state of verdure. The yellow and red flowering cotton trees, quite leafless, though in full flower, are also common over this bare jungle.

Here also we saw frequent evidences of the presence of the Neelgai; but, with our great band of coolies marching along with us, we were not likely to see much game.

We now began to rise suddenly up the flank of the Nimuljeery Conda, and here found a most welcome stream of running water, reported to from all the year round, The water shows nearly up to the top of the ravine, where it appears to rise from some out-cropping beds of slate intercalated with quartzites. The ravine is well wooded, but only close along side of the bed of the stream, whence rise up some splendid mangoe trees. Near the top there is a sufficient elevation to allow of the Bauhinia creeper growing most luxuriantly, spreading mischief all round with its parasitic stems.

Remembering what we had seen of the ravages of this creeper about Mantyconda, we brought an axeman to try and stop its growth in a small way, and here the woodman set to work with a will. The dark-coloured gnarled stem gives one the idea of a hard wood, while, on the contrary, it is quite soft and spongy, the cut surface looking extremely like raw beef; consequently, the ordinary narrow and thick headed woodman's axe of the country is not suitable for cutting the creeper down. Just where the stream commences to ooze out of the rocks, the Bauhinia had almost overpowered every thing but a few gigantic mangoe trees, though with these it was getting on pretty well; and in such a labyrinth of ropes and festoons of stems, we could do little else, but free the mangoes from one or two of their greatest enemies, when it was quite a pleasure to see the great pendulous trunks swing away free and death-smitten, as they were severed from the parent root.

We then got over the Nimuljeery ridge on to an elevated plateau of open jungle with long crops of hay, after crossing which, and some minor wooded valleys and ridges, the path began to descend the eastern side of the mountains by a dry ravine of slaty rocks, and so passed on into a broad valley. Here also the jungle is open and thin, with a crop of long and fine hay, but there are at intervals belts of thicker jungle of trees among which are many Yippas, the courses of the stream being, likewise, clothed with thick jungle.

This valley possesses the peculiar feature, according to the map, of having a stream without an outlet! and we camped beside it for the night at a watering place. The stream, as far as I could make out, runs south-south-east to Kistnumshettypilly. The water was not running, but lay in a dark pool, which probably becomes dry later on in the season.

From this point, we wished to move our camp in a north-west direction, somewhere on the path which our guide reported as leading up to Mantycondah, so as to get up to that hill, and come to a halt in the Brumeshwar valley, beside the flowing water. But before we ourselves could follow the camp, we wanted to see the whole of the Cotta Cunnama, and, if possible, the Nemilly Goondum waterfall to the north of the road, reported by Mr. Foote to be a place well worth seeing. Unfortunately there was only one guide, and it was necessary to send him on with the coolies; so, with the understanding that he was to cast a branch or some leaves on any turning of the road which he might follow we started by ourselves for the ghaut and waterfall.

As soon as the Cunnama gets out of the valley in which we had slept the night before, the path becomes more defined as a timber road, and begins to rise over a country of slates, when the sudden thinning-out and almost complete disappearance of the thicker jungle is surprising. Except in the bottoms of the ravines, and over a ridge or two of quartzite beds which are intercalated among the slates, the hills were most bare and arid looking. There was not even the rich crop of hay, but only a very poor and thin dried grass, scarcely concealing the rocky ground. The path now turned southwards, in order to get down a ravine, and so through a stream-gorge (where there was good water) into an extensive open flat valley, surrounded on all sides by low hills, except to the east-north-east, whence it opened out towards Aukiveed.

From this open bit of plain, we turned northwards and, after a most hot and fatiguing ramble (there is no sheltering jungle) up the back of a rough quartzite ridge, found ourselves on the crest of the western side of the Nemilly Goondum valley, about one o'clock in the day. There, we saw the stream of the waterfall about a thousand feet below us, but at the bottom of a most extraordinarily steep-sided valley. We had lost the path, and the wonder was how to get down such a precipitous slope; nevertheless we must get down, for I wanted water badly, and it would never do to give up now. So, down we went, first scrambling through a thin jungle of bamboo at the bottom of a little ravine, then for a good distance down a sambur path; until by sliding, creeping and slipping, holding on by the way at tufts of grass and bushes and avoiding the very hot rock we finally got to the bottom and found temporary shelter under a tree.

Hence, up the dry bed of the stream (wondering if we were to see water again), round a corner of rocks and trees; and then came in view half an acre of a deep pool of water, lying below a thin dribbling stream, which worked its way over and down the face of one of the finest geological features I have seen. Let me try and describe it. Nemilly Goondum valley has been formed in a U-shaped curve or synclinal of quartzite and slate beds, the slates being above the quartzites. The arms of this curve rise up on either side at great angles: on the west side, at any rate, at 60 degrees. The slaty beds which formed the nucleus of the curve have been denuded for some distance up the axis of the synclinal, thus leaving a U-shaped valley of quartzites, along the bottom of which the stream above the fall flows. At the fall, the quartzites themselves, for 30 or 40 feet in depth all round the curve, have been carried away, leaving a tolerably vertical face, down which the water runs to the great basin of the pool below. Thus, in looking over the pool at the fall, one sees in front 30 feet or so of quartzite beds curving up from the level water for 700 feet or more, as the steep sides of the valley. So steep is the rising up of the beds on either side, that it would be utterly impossible to get into the valley above the fall from below, except by scaling the vertical wall over the pool, or by coming from outside over either of the ridges bounding the main valley.

Very long ago, some old Brahmin or Saniasi came to this place, and was equally struck with the grandeur of the scenery according to his light, and the suitability of it for a place of pilgrimage; so he made a beginning of the small pagoda which is built at Nemilly Goondum, some way up, the side of the hill, where, probably, there is a finer view of this physical feature and the valley beyond, only I was too tired to go up to the temple to see. Indeed, I would have given much to have rested here until the next day, especially with that climb back up the ridge in the hot sun before us, but there was neither food nor shelter.

We were, however, fortunate in finding the path which we had lost at the top of the ridge, and so ascended much more easily than we expected; but, it was dark when we got back to our camping ground of the night before, and there were some six or seven miles to be got over before the new ground could be reached.

North-west road to Mantyconda.

Our road was tolerably clear for some distance (we had lit up some bamboos as torches, though there was soon no need of these, as the moon shone out in a short time) where it traversed a fine open forest of large trees and bamboos, with the usual accompaniment of long dry grass; and as, at times, we came to a diverging path, there was the now-withered branch, which our guide had left lying on the road to warn us from straying.

There was, to me, something very grand and mysterious in wandering thus through these forests in the quiet night, the silence only disturbed by the occasional barking of the deer, or the crackling of some burning tree. These burning trees, too, were a strange feature. Now and then, there was a little flame away on one side of the path which, with a few solitary stumps of trees, looked so excessively like a group of men beside their fire, that our people on one or two occasions shouted out at the supposed friends. Or, at times, solitary trees would burst out into flames from top to bottom, as the breeze rose a little; or the more frequent sight was the stump glowing red close to the ground, while, stretched away from it, was a broad line of ghastly white ash deposited on the sward, all that was left of the great trunk. But I think the most solemn sight of all was a great tree standing up in the air, from root to the furthermost twig a red smouldering mass within the dark shell of bark. As the breeze fluttered up, we saw the open seams and crevices in the bark redden out, casting off sparks of fire; and long after passing it we could see this natural bit of pyrotechny throwing out, as the wind freshened, thick showers of sparks from the branches and trunk which would so soon all sink quietly to the ground. I call this a solemn sight, because all this destruction was going on so quietly, as it were without an effort, in the great forest, which appeared to be endless in the distant darkness of the night, quite a different sight to the spirit-stirring roar and flare of the forest fire in the day time.

All this time, the path had been going along a tolerably level valley without rising much; but now, the branch cast on the road directed us away to the north-west over such a rocky bit of ground, leading straight for a high ridge of hills which we did not expect to cross until much further north, that we began to doubt the sign we had seen. There were however, more dead branches lying on the path; and we rose higher and higher, through small belts of thick jungle, and along plateau terraces of more open country covered with long dry grass. The outlines of the ridges were also becoming so much more indefinite as to shape and distance in the moonlight, that we soon lost most of our confidence in these as guides, and began to be almost as despairing of reaching any camp before next day as our men, one or two of whom began to want to sit down, or say they had got fever.

However, there was no good in going back, as we had now proceeded some six miles; so on we went, keeping the men well in front to prevent their lagging behind or sitting down, and getting higher and higher into an atmosphere that was quite fresh in its coldness, until at last we turned up a valley which seemed to be in the right direction. This led us eventually up to a high saddle on the main ridge; and about 10½ P. M., our shouts were at last answered, when we emerged from the forest on an old camping ground with deserted huts,* where our people had pitched the tent.

This camping place was about 2,250 feet above the sea, among thickish jungle, and there was a poor spring of slightly milky-colored water in the bed of the little ravine close by.

The Mantyconda Forest basin.

Our march, next day, to Mantyconda and the Brumeshwar valley showed that the above watering place, which, as far as I can make out, must have been about eight miles east-south-east of Mantyconda, lies on the eastern edge of a great forest basin extending up to that hill. This is the area of best forest land on the mountains; and it may be considered roughly as limited on the north by the Yellagode and Brumeshwar wartershed, while to the east it gradually thins down into the valley leading out to Nundial, thus giving at least a hundred square miles of good forest.

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* Said to be huts of Wudders, or of people who work in the forests.

The path now led through continuous green forest, generally thick and full of large trees of all the kinds already detailed; and when we occasionally ascended a high point to make out our position, there was nothing but this sea of forest-covered hills spread out before us. The Teak and Nullamudday were often very large; but wherever they were so, in nearly all cases, the over-reaching Bauhinia was battening on them. Indeed, the way in which we found out that our guide was leading us aright was by coming on an unfortunate teak-tree, which had been remarked by Mr. Thomas, on our previous walk eastward from Mantyconda, as having been so peculiarly split down by this creeper.

There are three good watering-places on the path through this forest basin, the head-waters of the Nundial stream. The middle one, about 4½ miles from Mantyconda, is a large and deep pool of water that, with a little trouble, might be made a good station for one or two elephants, which might be most effectively used in dragging the large timber up to the western edge of the mountains. It is this difficulty of dragging their timber out, that causes the wood-cutters to divide the large trees into such small pieces.

Early in the evening, our guide brought us to the garden of Mantyconda, and there, to all intents and purposes, washed his hands of us. He said he could guide us no further; and from this point, in his eyes, the roads went into the forest and came back again: but we were determined to get at the flowing waters of Brumeshwar, whether there were a road or not, so took him with us.

Mantyconda to Brumeshwar and Yellagode.

After a few trials along other paths (when it was amusing to see the mixed look of doubt and resignation in Gurrupoo's face), we found a fine old road, along which one might drive for a mile or so, leading to the very place we wanted to halt at. For this mile and more over the water-shed the path is very level; and then it descends slightly into a lower basin of forest, along which it runs, until the head of a pretty glen of almost tropical vegetation is reached, down one side of which the road goes by an old but well made and built ghaut.

This glen is certainly not of any great extent, being about a quarter of a mile long, but it is very deep and narrow, and densely grown with dark-green foliaged trees, among which are very large bamboos and fine sago-palms, presenting a vegetation quite as tropical as what I have seen myself in the south of Ceylon, and which Mr. Thomas likens to that of the western coast of India. Unfortunately, it was getting too late in the evening, to explore the bottom so as to ascertain the amount of water. As it was, we just got to our camping ground by night-fall.

At the bottom of the ghaut the road appeared to be trending too much from the desired direction (it probably runs down into the eastern part of the Brumeshwar valley), so we turned off to the north by a side path. This became very indefinite, but still went in the right direction, leading us into a widish and nearly hill-locked valley of even wilder-looking forest than we had hitherto seen. The path took us past great clumps of bamboos which appeared to extend generally over this little basin; in fact, it is more a bamboo valley than otherwise, though, scattered through it, are large Goomer-teaks and many stumps of teak trees 8 or 9 feet in circumference. The wood-men do not appear to have meddled much with this little valley for some time. The path is evidently very little used; and it appears to be the only one leading over a low saddle into a very dry and open bit of the Brumeshwar valley, where there is an old camping ground, not far from the head-waters of the Brumeshwar stream, or the stream valley which I had reached 10 days previously from Yellagode.

Our people had got gloomy (Gurrupoo particularly so) in the bamboo valley, on seeing me follow a path so indistinct, while the evening was gathering fast, and they looked still more gloomy, when I led them over the low ridge into the baren open ; but the sight of the flowing water soon restored them all. The Chensulah was delighted with the valley—he said there was no other place like it on the mountains for water and trees, and was apparently thankful for the additional bit of road information he had got from me.

Another good stream from the north-west joins the one I had previously seen, and the two flow away in a broad belt of jungle as the feeder of the Nemilly Goondum water-fall.

Next morning, we worked up the stream by the path to Yellagode, and so to the crest of the mountains overlooking that village. From this point, 2,700 feet above the sea at least, we reached the watering-place at the bottom in an hour, rested there for breakfast, and when the mid heat of the day was passed rode into Yellagode in an hour and a half.

I have been thus particular in describing the route from Mantyconda to Yellagode, because the villagers all say there is no path. I think, also, that the route from Yellagode to Mantyconda is much pleasanter than that from Nundial to the same place. There is an old bungalow at Yellagode, and it is a large village, whence supplies and coolies may be got. In a night one could drive from Kurnool to Yellagode and next morning, by 8 or 9 o clock, be up on the mountains. Yellagode is also very well situated between the two taluqs of Nundial and Nundycotkoor for a good Jummabundy station; and it would be a very good depôt for timber. A short path might easily be made direct from the crest of the Brumeshwar basin to Mantyconda; and this would just be along the line of country best suited as a situation for bungalows. Water might also possibly be found by sinking wells on this line. Captain Beddome rightly says, I think, in his report on these mountains: "that they are in no way adapted for the cultivation of Coffee, Tea, or Chinchona;" but it would be an interesting experiment to try the last in a garden on some of the ground between Brumeshwar and Mantyconda, and what a great thing it would be for Kurnool, if potatoes could be grown at Mantyconda, a feat in gardening which seems not impossible.

Irla Conda.

There was still one more excursion to be made before the conclusion of our hill-trip; and this was to look at part of the range to the north, on the right bank of the Kistnah, which had occasionally seemed to me to be rather elevated. This is the plateau range of hills marked on the map, with "Irla Conda" station as the highest point.

Our camp was moved north from Yellagode to Atmacoor, about eight miles; and thence, having collected coolies and guides, we started nearly direct for Irla Conda. It turned out that this plateau of hills is much lower than any we had been on yet; Irla Conda itself being hardly 2,000 feet above the sea. That part of the hills south of the trigonometrical station is very well represented on the map, being a peculiarly flat plateau; but, the country between the Irla Conda stream and the Kistnah is much broken up into smaller valleys and hills.

We camped for the night in the narrow valley south of Irla Conda, near a stream of good running water; I think the best water we had tasted on the Nullamullays. It rises near the top of the ravine, issuing from the outcrop of almost horizontal beds of quartzite, which make up the plateau. There is not much forest to speak of over the Irla Conda group of hills.

Next day, we got down into the bed of the Kistnah, about east-north-east of the peak, intending to work up the river to Veerabudr Droog: a journey which we managed to do in two days' hard walking, as no horse could be ridden over such rocky ground. The area on the left or north bank of the Kistnah, marked in the map as "Impenetrable tract, unsurveyed," does not answer exactly to this description. It is not at all impenetrable, being much like the rest of the Nullamullays, with thinner jungle; but it would be a difficult country to get at for surveying, and in which to procure supplies, hence, perhaps, the reason for its having been left unsurveyed. There is also, however, the other story; that, by some remarkable coincidence, the field books of the surveyors were lost.

The Kistnah.

The Kistnah, about here, does not flow in a narrow gorge, as is often supposed, but merely in a deep and wide mountain valley; and there is, as a consequence, no cliff scenery of any note. At the time of our visit, the water was probably near its lowest; but, when the freshes are down, it must be from 30 to 40 feet higher, as is clearly shown by the water-mark along the banks. Then, indeed, the river must be a grand sight, with its swollen and turbid waters sweeping quietly along; for the surface would be then far above its rocky bed, while its width must be great at some points.

There cannot, at such a time, be a very swift current—or the water must be very heavily loaded—for the deposits of rich silt all along the steepest banks are frequent and extensive. At flood time also, the great mass of water must form quite a wall or barrier, against which the side streams, as they come down from the hills, are backed into quiet water in which thick deltas of sand have been formed, with their steep shore-edges just in a line with the edge of the flooded river.

As it was, we saw the true channel of the Kistnah throughout this part of its course which, except for a rapid here and there, is often cut, like a canal, in the nearly horizontally-bedded quartzite rocks. In one case, we walked along a reach of smooth water for nearly six miles, as it flowed in a vertical-sided channel. The other reaches were also tolerably long; and at no points were the rapids of much length.

The rock-exposures in this river bed are wonderful. Looking at the way the beds lie; at say 5° east-south-east, we must have walked, on one occasion, over the successive edges of at least 2,800 feet of quartzite beds, all fairly exposed. One might almost reckon the height of some of the hills to the north at sight, as the outcrop of beds from the river is seen contouring along the valleys and up the slopes to near the crests of these hills. And nearly all these miles of rock-surface are polished and varnished, as it were with a coating of black-lead; the combined action of the river and atmosphere having formed on the surface of the usually white and buffish-colored rock a deposit of peroxide of iron. The smoothing and polishing are easily accounted for, but it is extraordinary what little effect this long-continued wear-and-tear has had in rubbing down the edges of the outcropping quartzite beds. These have almost lost their ordinary sharpness of angle, it is true, but they are as square as on the day they became exposed.

Towards Veerabudr the river bed becomes a perfect museum of true geological effects: as they are seen in the way the rocks are lying, the form into which they have been worn down, their constitution, and the manner in which they have been altered or metamorphosed. The first is exhibited splendidly in the low cliffy banks, where the beds are lying in horizontal steps, or in great curves which rise up from under the hill sides. Denudation is seen, not only in the effects of the old action of the present river, but in more ancient stream-beds, now filled up by a conglomerate of the coarsest and most varied constitution, which has since been itself again scoured out for the channels existing at the present day. This conglomeratic sandstone has been metamorphosed into a beautiful quartzite and jaspideous rock of most opposite colors, owing to the number and variety of its constituent pebbles and shingle ; rendering the now polished bed of the river a splendid natural mosaic, or a rougher concrete, of a general red color, marbled with pinks, greens, greys, and browns, quite astonishing to behold. Further up the river, nearer the Droog, there are other varieties of rocks rising up from underneath the quartzites already walked over, such as sheets of igneous rock (trap) and volcanic ashes; which not only give interest to the geologist's study of this part of the Kistnah, but bring about some slight changes in the scenery and physical aspect of the country.

The hill country to the north of the Kistnah, for the length of river I traversed, appears to be but thinly covered with jungle, except in the ravines. Further investigation will tell us more of the country to the eastward of this ; but, from all I can learn, the Mantyconda forest basin is, so far, the richest area on the mountains. Next to this, the broad valleys of the Nundial and the old Roodrar tank streams are fine dry forest lands ; nor should I forget the valley on the western side of the Nundy Cunnama (the trunk road across the mountains), which is connected by its forests with the two valleys just mentioned.

Here we finished our rapid run over the Nullamullays, leaving, unfortunately, much country that is still to be explored, especially the region to the north of Cummum and along both banks of the Kistnah to the eastward of Irla Conda. I do not expect that there will be any higher regions found than those already noted, or even better tracts of jungle ; but it is reported that there are many interesting ruins and some fine scenery ; and the Natural History, Botany and Geology of this part of the country seem to promise every reward to the searcher. The mere navigation of the mountain valley of the Kistnah from end to end (a feat, I believe, yet unaccomplished), apart from the novelty and peril of the journey, would be of interest, as one of the Irrigation Company's former Engineers has thrown some doubt on the accuracy of the course of the river, as laid down in the Atlas Sheet.

NOTE.—I have throughout this paper generally used the Telugu names of trees. Captain Beddome has in his Report given a list of all the trees known on the Nullamullays, from which I take the liberty of extracting the scientific terms for a few noted by me.

Billoo.	Satin wood (Chloroxylon Swietenia).
Chiriman.	Conocarpus Latifolius.
Goomer-teak.	Gmellina Arborea.
Jitigi.	Rosewood (Dalbergia latifolia.)
Nullamudday.	Terminalia Tomentosa.
Tunki.	Ebony.
Yippa.	Hardwickia Binata.
Yerramudday.	Terminalia Arjuna.

A Report by J. E. Mayer, Esq., Deputy Inspector General of Hospitals, on the quality of the water supplied from the so-called Seven Wells, the real number of which is ten, for the use of the Troops at Fort St. George.

The general characters of these waters are that all of them contain animal and vegetable organisations, and that the amount of these organic matters varies from 3·90 grains to 7·85 grains in the gallon, *i. e.*, that the smallest amount found at present doubles that which the Authorities at Home consider passable.

No attempts have in these examinations been made to ascertain the respective amounts of animal and vegetable matter (both being included under the head of organic matters), nor, on reflection, will this appear necessary, as the total amounts found are so much above that which is henceforth to be permitted in water that may be pronounced fit for internal use. Had the total amounts found been smaller and nearer the prescribed limit, the question of respective amounts would then have assumed a practical bearing and have become one of importance: but we are of opinion that it can be scarcely so regarded in waters which all of them contain organic matters so much in excess of the recognised limit; and for that reason alone must in their present state be regarded as unfit for internal use.

On the total amounts of impurities in these waters, a few words will suffice, as the Reports shew that they vary from 23·10 to 70·10 grains in the gallon, and that these impurities contain, besides the organic matters, chlorides and sulphates in various quantities. The quality of sulphates in each water has not been determined, the qualitative examination, taken in conjunction with the absolute determination of solids; and then of organic and inorganic matters; with the determination of the amount of chlorides volumetrically, being for all practical purposes, we believe, sufficient. Had there been any reasonable doubt as to the character of these waters, then, undoubtedly, the absolute determination of the sulphates would have been not only desirable but necessary. It is well known that sulphates and chlorides, together present in quantity in any water, act injuriously both on men and cattle; and, further, that many sulphates in the presence of organic matters, especially in tropical temperatures, are subject to a process of reduction, and are thereby converted into sulphurets, which last, by the simultaneous oxidation of the carbon of the organic matters, and by continuance of the other processes, are converted into oxides, while sulphuretted hydrogen is given off—a gas that is notoriously hostile and deadly to all animals endowed with the higher forms of organisation. For these reasons, all waters in which sulphates and organic matters are present, especially in tropical countries, are unfitted for internal use. It will, then, be only necessary, in order to form an accurate estimate of the qualities of these waters, to bear in mind; 1st, that they contain large quantities of animal and vegetable matters; 2nd, that chlorides and sulphates are present in various quantities; and finally, that, independent of the deleterious combined action of chlorides and sulphates on the human body, organic matters with sulphates are present.

It does not appear, after the general considerations now submitted, that there is any necessity for dilating on the individual characters of the waters of any one of the wells which have been examined. Well, No. V. is the least objectionable, but even this water, independent of other impurities, contains double the amount of organic matter that is regarded as passable. It only remains to offer a few remarks on the question of filtration. The received opinion has been that all impurities which are soluble cannot thus be separated; and this is undoubtedly true so far as relates to the mechanical effects obtained by the use of paper, cloths, sieves, sand, &c., all of which have no chemical or special action on the fluid passed through their interstices; but if the filter be made to consist partly of a porous substance such as sand, and partly of another capable of exercising a chemical or special action, such as powdered charcoal or magnetic* oxide of iron,—then the case is altered, and the degree of purification to be obtained by these means remains to be determined by repeated experiments on a large scale. It may be said that the numerous experiments of Doctor * * * and others for the various Water Companies at Home have already determined this point. It appears to us, notwithstanding, that this point has not been so satisfactorily or clearly settled as could be wished; inasmuch as the results obtained immediately after new filter beds have been set up, and those obtained some time afterwards, have been greatly at variance, and further, that the results obtained by different experimenters have not always coincided. It is evidently nothing beyond the truth for Mr. A. or Dr. B. to give a certificate to the effect that a certain apparatus will cause the most striking and wonderful improvement in bad and foul water, &c. &c.; but in practice and on a large scale, it is not possible to renew the sand and charcoal every few hours, and to have sets of sponge constantly undergoing a process of purification, so as to be ready for constant change. Thus it happens that what can be obtained by careful operative Chemists in the Laboratory far exceeds that which the practical Engineer can obtain on the large scale outside, where the constant care, watching, and change resorted to in the Laboratory (the re-setting up of the apparatus as it were), is impossible.

*Vide Note appended.

Professor Parks, in his late work, published for the benefit of the Medical Officers at Netly, gives the statement shewn in the margin: it remains to be seen how far further experiment will confirm these statements, and whether by percolation through large beds of sand and charcoal such impure waters as those now reported on can, even at first, be deprived of 88 per cent. of organic matter and 10 per cent. of inorganic.

Of all these substances, charcoal is the best; it can remove 88 per cent. of organic matter, and 28 per cent. of mineral matters. It has removed 7·48 per cent. of chloride of sodium, 8·5 per cent. of lime salts and 2·3 per cent. of sulphuric acid (Witt).

There is one fact bearing on this point which we think it our duty to bring prominently before the Committee, and through them before Government. Repeated borings (not less than 150) in every part of the thickly inhabited localities of Madras, with the examination of the soil thus turned up, have proved that, however pure the water at certain depths might originally be, it could not long remain so, as the superincumbent and surrounding soil is saturated with filthy decomposing organic matters of every kind, and it is scarcely necessary to observe that water, by percolating through such soil, will, of necessity, become loaded with organic impurities, and thus rendered unfit for internal use. The evidence on these points is so conclusive and so easily obtainable, that it does not seem needful to insist on them further. A little consideration will show that if these statements are really true of Madras, they will obtain in a more or less marked degree, wherever there is a dense population with habits and customs such as those of the Madras people; and that the soil will be soddened and fouled with organic decomposing matters in like manner: the facts, therefore, admit of generalisation, and it may be received as a law, that, wherever there is a dense Native population, there the soil will become foul; and that it is from this cause impossible to obtain, for any length of time, good water from the wells sunk within the polluted area, however good the water may be when first drawn. From this the natural and only sound inference to be deduced seems to us to be, that it will be necessary for Government to look for water beyond this polluted area: and if the supply be required only for the Fort, probably the simple apparatus now in use at the so-called 'Seven Wells' would be sufficient, supposing that the wells be sunk a mile or thereabouts beyond the limit of dense population.

NOTE ON THE MAGNETIC OXIDE OF IRON.

As this substance has lately been brought prominently before the public, and has been much lauded on account of its special action in purifying waters; and as, moreover, a Committee of the National Exhibition have lent the sanction of their names to it, as a voucher for the above mentioned special quality, it appears almost necessary in a paper of this kind to offer a few words respecting it, particularly in reference to the two questions of Natural and Artificial supply.

Magnetic Oxide of Iron, it is well known, is a natural product found largely in certain localities; but it is very questionable whether it can every where be so readily obtained, and in such quantity, as to make its use practicable on a large scale. All the reliable information on this head, that has been procurable, will be given at the end of this note; and if it should turn out that this product can only be had here and there, and in places at considerable distances from those situations, whereat filter beds are to be made:—then, the only resource will be the artificial product—and in order to afford a clear view of the practicability of resorting to it, the shortest way will be to give the mode of preparation. This is as follows: and the description of the process, with the information in the note* given below, will enable any one to manufacture the compounds under consideration.

Process.

To obtain artificially Magnetic Oxide of Iron, having the Formulæ $\underset{3}{\mathrm{Fe.}}\,\underset{4}{\mathrm{O.}}$, such quantity of the green Proto Sulphate of Iron as will afford the required quantity of Oxide being taken, the crystals are to be dissolved in pure water; two-thirds of the solution thus formed is to be poured into a second vessel, and to this portion, which is to be boiled, Nitric acid is to be added till brown vapours are no longer given off. The Iron contained in this portion will now be in the form of Sesqui Oxide, while in the one-third, which has not been boiled, the Iron remains in the form of Protoxide. The two solutions are to be mixed together; the mixed solutions are then precipitated by the Volatile

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[*] Every equivalent, or 139 grs., of the crystalised green Sulphate of Iron contains 36 grs. of the Protoxide of Iron; therefore 1 lb. Avoidupois, or 7,000 grs. will contain $x = 1813$ grs. or 4 oz. 65 grs. of the Protoxide, and any other quantity in proportion; but it is not the Protoxide of Iron that is wanted; it is the magnetic oxides, of which there are two,—Now, to understand how these oxides are formed, as well as the reasons for the process here given, it will be advantageous to set down in order the various oxides of Iron with their appellations and Formulæ, it being premised that Fe stands for Ferrum, Iron, and O for Oxgyen.

Protoxide Fe. O.: Sesqui Oxide $\underset{2}{\mathrm{Fe.}}\,\underset{3}{\mathrm{O.}}$

These Formulæ convey, in short, the important information that the Protoxide of Iron is composed of one combining quantity of Iron, and one combining quantity of Oxygen; and that the Sesqui Oxide is composed of two combining quantities of Iron, and three combining quantities of Oxygen. This being understood, the composition of the magnetic Oxides will be at once evident, their respective Formulæ being $\underset{3}{\mathrm{Fe.}}\,\underset{4}{\mathrm{O.}}$ and $\underset{4}{\mathrm{Fe.}}\,\underset{5}{\mathrm{O.}}$ since it is patent to every one, that one atom of the Protoxide and one of Sesqui Oxide, when united, equal the first magnetic Oxide, and in like manner it is plain that two atoms of Protoxide, and one atom of Sesqui Oxide, when united, equal the second magnetic Oxide.

$$\begin{array}{r} 1\ \mathrm{Fe.\ O.} \\ \underset{2}{\mathrm{Fe.}}\ \underset{3}{\mathrm{O.}} \\ \hline \underset{3}{\mathrm{Fe.}}\ \underset{4}{\mathrm{O.}} \\ \hline\hline 2\ (\mathrm{Fe.\ O.}) \\ \underset{2}{\mathrm{Fe.}}\ \underset{3}{\mathrm{O.}} \\ \hline \underset{4}{\mathrm{Fe.}}\ \underset{5}{\mathrm{O.}} \\ \hline\hline \end{array}$$

The above composition having been clearly demonstrated by repeated and careful analysis, they suggested the artificial process, of which the dominant conditions are, that the protoxide and peroxide should be brought together in the particular proportions shewn, and in a recent state. How this is effected will be seen in the text of this paper.

Alkali or Carbonate of Soda, and are boiled: during the boiling the mixed Oxides unite and form the black Magnetic Oxide. $Fe_{3}O_{4}$. To form the Magnetic Oxide $Fe_{4}O_{5}$ the processes are precisely similar, in all details, except that only *half* the quantity, instead of *two-thirds* (as in the first case), is peroxidised by boiling with Nitric acid.

After the details above given, it does not seem necessary to enter further into the question of whether the artificial Magnetic Oxides can be obtained so readily and economically as to render their use practicable on the large scale, as any process involving accurate weighing, solution, accurate division by graduated measures, boiling and precipitation, besides some expenditure for re-agents, would be inapplicable.

The process has, however, been made available for the manufacture of a sufficient portion of artificial magnetic oxide, to test its efficacy as a filtering and purifying agent.

The same water in the same quantity was used in each of the experiments recorded in the Table of Results marked Y.

TABLE Y.

The water selected for the following trials was notoriously bad. It was taken from a Well in the compound of the Madras Medical College. The quantity experimented on was the 16th of an Imperial Gallon.

Previous to any filtrations, one-sixteenth of a gallon was evaporated to dryness, first on a porcelain dish and finally in a Platinum capsule of known weight. It left a total amount of residue=grains 15·08, and after ignition (with the usual precautions) grains 12·52, which was taken as the inorganic impurity present, and the loss, grains 2·56, as the organic. Nine separate sixteenths of a gallon of the same water, were then carefully filtered through the materials noted below. The filtrates were then separately evaporated, and the residues left weighed and set down opposite the filtering material used. These various residues were then ignited, and the respective residues again weighed are set down in order—the loss in each case being the organic matter. The figures thus obtained by being respectively deducted from the amounts originally present, shewed by the difference how much had been separated by each filter material.

Total impurity present previous to filtration 15·08 grains, *i. e.*, in the gallon 241·28 grains. This total represent organic and inorganic impurity.

Residue left after ignition found equal to 12·52 grains, *i. e.*, in the gallon 200·32 grains.

Difference, *i. e.*, organic matters burnt off, equal 2·56 grains, or, calculated on the gallon, equal 40·46 grains (☞ *Vide note.*)

A	B	C	D	E	F	G
MATERIAL USED FOR FILTRATION.	Total left after evaporating filtrate.	Residue left after ignition of B.	Difference B and C.	Organic matter separated by each agent, *i. e.*, difference between D and original amount present.	Percentage amount separated	Amount separated by each filter calculated on the Imperial Gallon.
		Grains.	Grains			
1. Ordinary filter paper... ...	14·69	12·36	2·33	·23	8·98	3·68
2. Swedish filter paper	13·87	12·24	1·63	·93	36·36	14·88
3. Clean white sand	15·14	13·09	2·05	·51	19·19	8·16
4. Sand and Charcoal	14·93	12·94	1·99	·57	22·35	9·12
5. Natural Magnetic Oxide of Iron...	14·18	12·49	1·69	·87	34·00	13·92
6. Artificial Magnetic Oxide of Iron...	14·14	12·50	1·64	·92	36·00	14·72
7. Finely divided mica or tale...	14·22	12·39	1·83	·73	28·51	11·68
8. Swedish paper and Magnetic Oxide of Iron	13·99	12·37	1·62	·94	37· nearly.	15·04
9. Swedish paper, Magnetic Oxide of Iron	13·94	12·33	1·61	·95	37·10	15·20

Column F has been inserted for the sake of the comparison which can thus be made between the results here set down and those obtained by other experimenters, who have recorded their results in this way,—"inter alios," Doctor Parkes.

Column G. has been inserted, 1st, because many experimenters have chosen this mode of expression, and secondly, because the results thus shown will probably be more readily appreciated by those who are not professed Chemists.

☞ *It being remembered that, in the* 16*th of a Gallon,* 2·56 *grains of organic matters are present, therefore* 40·96 *grains will be present in one Imperial Gallon.*

A few remarks on the Table just given seem to be called for, in order to point attention, in the first instance, to the differences in the materials employed. Nos. 1, 2, 3 and 7 are materials to which no other than mechanical action has ever been attributed. By this agency, they separated from one-sixteenth of a gallon of the same water respectively,—

		Grains.
1	Ordinary paper	·23
3	Clean white sand, ...	·51
7	Finely divided mica ...	·73
2	Swedish filter paper ...	·93

These figures, if the original amount of organic matter present in one-sixteenth of a gallon be taken as 100, give the per centage proportions shown in Column F. Thus it appears that of these four mechanical agencies, No. 2 is by far the best; No. 7 the next best, and so on; and that out of 100 parts, the best mechanical means tried was only able to separate 36·36 parts. Nos. 5 and 6 are materials to which special purifying powers have been attributed. The percentage quantities separable by their means are shewn in the same column of the Table to be 34·00 nearly, and 36·00 nearly; *i. e.,* these special agencies are neither of them quite so powerful as the best mechanical means. Finally, the results of filtration by mixed agency, as shewn by Nos. 4, 8 & 9, shew not only great diversity of results, but that those obtained by means of sand and charcoal. (No. 4) require, in order to make such materials effective, certain other precautions which could not be adopted in this or that case, without vitiating the first principal of comparative investigation,—that, *viz.*, of placing all the substances experimented on under " precisely similar conditions,"—and it will be observed that in none of these experiments has this canon been departed from. The simplest means, the same sized funnels and the like quantities of materials were in each instance employed. In no instance have special arrangements, packing, or adjusted pressure been resorted to ; but without these means, the filtration by double agencies, as shewn by Nos. 8 and 9, appears to exceed in a slight degree the purification that is obtainable by single mechanical agencies. Whether the magnetic oxide of iron acts by its insolubility and specific gravity in such a manner as to form very minute pores through its mass,—or by any special mode of action, has not been investigated by us. The artificial product is a finer powder than the natural magnetic oxide, and it acts both singly and in conjunction with Swedish filter paper better than the natural product, which considerations tend to impart the idea that, after all, it acts mechanically, and not from its possessing any peculiar purifying power. From a partial examination of Spencer's Filtering Apparatus, it was evident, 1st, that a sponge under a graduated pressure was employed as a preliminary mechanical means of intercepting impurity, 2ndly, that pieces of sponge cut very small, were interspersed through the material in the body of the filter. What further special arrangements may have been employed we are unable to say,—as it was not thought worth while to destroy the Apparatus for the sake of such information. It was sufficiently evident that all the precautions, before adverted to, and generally deemed necessary in the manufacture of Filters, had been carefully attended to. With all these advantages, however, the results obtained by its use, were above those obtained by the use of Swedish filter paper alone, only in the proportions shewn by the figures below :—

Swedish filter paper,	1·63.
Spencer's filter,	1·60.

A further experiment was made to ascertain if double filtration through Spencer's Filter and Swedish Filter paper would make any difference in the results. It was found to do so, reducing the quantity of organic matter left present in the filtrate to 1·57, and the amount separated would thus equal ·99, which, represented as a percentage, = 39·00, nearly. From this experiment viewed in connection with what has been previously advanced, we are strongly inclined to look upon filtration generally, excepting that through various kinds of charcoal,* as essentially a mechanical act, and we believe that, the finer the pores of the filter, the more insoluble the filtering materials, the greater its specific gravity, and the less, its liability to be disturbed,—the more perfect will be its action. We doubt the utility of any material like sponge, either on the small or on the large scale, as, however perfect it may render an Apparatus for a while, it is well known that very frequent renewal and careful washing, as well as exposure to the air (ozonisation) to get rid of fœtid odours, is necessary to keep these machines in good order ; but, notwithstanding all the objections that we have here urged to particular views relative to modes of action, or to forms of Apparatus, we think, with reference to the manufacture of filter beds for Towns, &c., that Table Y. shews undeniably that the natural magnetic oxide of iron holds a high place as a filtering agent. By its means nearly 34 per cent of organic matter were separated: it is superior to finely divided mica, and inferior only to the artificial magnetic oxide, and to Swedish filter paper; both which are inapplicable for all but Table or Laboratory experiments.

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* Even with reference to charcoal, and its well known power of condensing gases in its pores, it is scarcely necessary to observe that its series of special actions (which generally commence with the condensation of the atmospheric air) are only to be kept up by a renewal of the primary conditions, and that if these be not renewed, its special actions merge into those of a mechanical agent.

If the statements made at page 110 by Dr. Parkes (noted by us in a former part of this paper) have been held in mind, it will be observed that we have not been able to confirm them. The utmost amount of organic matter that we have been able to separate by filtration is less than 40 per cent, and differs widely from 88 per cent, as stated in the work above mentioned.

With reference to the ready procurability of the natural magnetic oxide in various parts of India, we beg to submit such information as we have been able to obtain.

Inquiries at the Government Central Museum have shewn that magnetic iron ore is to be found at many places in the Vellore Taluq, &c.—*Vide* page 25 of the Catalogue of Articles contributed by Madras to the International Exhibition of Works of Industry and Art, held in London, 1862.

By reference to the Catalogue of the iron ores of Southern India, it will be found that the following are named as localities from which iron ores can be obtained, viz., in numerous villages in the Northern Division of Arcot; in some places in the Bellary District; in many places in the Canara District; in several localities in the Chingleput District; in several places in the Cuddapah District; in some places in Guntoor and Kurnool; from one place in Madura; from twelve different places in Malabar; from some places in Masulipatam; from many places in Mysore, Nagpore, the Neilgherries, Rajahmundry, Salem, Tinnevelly; but whether it can be had in quantity in all these places is not stated.

In reply to some inquiries casually put to him, Dr. Aitken states that he has seen immense quantities of magnetic oxide at Coimbatore.

In the Memoirs of the Geological Survey of India, Volume IV. Part 2, valuable information is to be found in reference to the localities in which magnetic oxide of iron is to be met with, and in the Appendix to this Volume, the magnetic iron beds of Kunjamully near Salem, are admirably described. They are said to be very extensive and the supply of ore inexhaustible.

Unfortunately for the purpose considered by the authors of the work quoted, *i. e.*, the manufacture of iron, the absence of appropriate fuel in quantity interferes so greatly as almost to interdict it, or, if not, to reduce any profit obtainable thereby to a minimum. In like manner the cost of transport from one place to another will, it is apprehended, interdict the use of the magnetic oxide as material for filter beds, except in such places as those in which the oxide in question is found. Three and half Rupees per ton is the price paid by our Porto Novo Company for the carriage of the ore a distance of 20 or 25 miles.

NOTE.—As Doctor Wyndowe was not present when this paper was drawn up, it is necessary to state in explanation of the word "we" (which appears throughout the paper) that I felt myself fully justified in using it, from the knowledge that our convictions as to the mode of investigating the questions naturally arising out of the analytical results obtained, were identical, and I am gratified in being able to add that, after having carefully gone through them with Doctor Wyndowe, I found that he concurs fully in all that I have said, and that, accordingly, in using the plural expression, I did in fact but anticipate that complete agreement between us which is now ascertained.

J. MAYER.

RESULT OF ANALYSIS OF WATER BY DR. MAYER AND DR. WYNDOWE.

WELL NO. I.

Sensible properties.	*By Dr. Mayer and Dr. Wyndowe.*
Appearances	To the unassisted sight, clear transparent.
Microscopical appearances, obtained from deposit after standing (with proper precautions.)	Gave clear evidence of the presence of animal life as well as vegetable growth.
Odour	Distinct, reminding one of water taken from a ship's tank, or water which has stood some days in a goglet.
Taste	There is an absence of that grateful and pleasent briskness that good water should impart to taste.
Chemical properties.	
Reaction to test paper	Perfectly neutral.

	Dr. Mayer.	*Dr. Wyndowe.*	*Mean.*
Solid ingredients in one Imperial gallon obtained by calculating from residue of evaporation of 2/10th gallon by Dr. Mayer, and of 1/10th by Dr. Wyndowe. *	grs. 36·15	grs. 33·7	grs. 34·925
Amount of organic matters present obtained by ignition of above residue re-carbonating and calculating from loss, on one Imperial gallon.	grs. 7·25	grs. 6·2	grs. 6·725
Difference between these two determinations being Salts, &c.	grs. 28·90	grs. 27·5	grs. 28·200
Hardness to soap test, having reference to standard water containing 16 grains carbonate of lime to the gallon, with which 22° of the graduated burette forms a permanent lather, and each degree may be assumed equivalent to 0·727 grs. of carbonate of lime, or 0·989 grs. of sulphate of lime.	14°	14°	14°
Of the above hardness, temporary, that is, removable by boiling, &c.	3°	3°	3°
Permanent	11°	11°	11°
Chlorides determined by the volumetrical method, and calculated as chloride of sodium in one gallon.	grs. 12·86	grs. 12·86	grs, 12·86

Bases in solutions by carbonic acid.

Iron	Traces.
Lime	Average quantity.
Magnesia	In quantity rather more than the average of waters.

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* NOTE.—In all the other Analysis 2/10th gallons were taken for this determination.

In solution after boiling.

Lime	In rather large quantity.
Magnesia	Do. do.
Chlorides	Shewn above quantitatively.
Sulphates	Not in large quantity.
Nitrates	None detected.

These last results being qualitative merely, the remarks are as agreed between ourselves; the opinions expressed are formed upon the result of the application of known tests upon equal quantities of water, *viz.*, 1/10th gallon —each of us making a separate experiment.

WELL No. II.

Sensible properties.

Appearance	Clear transparent.
Microscopical appearance as in No. 1.	Gave evidence of the presence of animal life as well as vegetable growth.
Odour	None.
Taste	Not so fresh as good pure water should be; but in this respect it is better than No. 1.

Chemical properties.

Reaction to test paper.	Decidedly acid, becoming alkaline after boiling some time.

	Dr. Mayer.	*Dr. Wyndowe.*	*Mean.*
Solid ingredients in one gallon Imperial determined as in No. 1.	grs. 31·60	grs. 31·9	grs. 31·75
Amount of organic impurity..	grs. 6·90	grs. 7·4	grs. 7·15
Salts, &c.	grs. 24·70	grs. 24·5	grs. 24·6
Hardness to soap test, *vide* No. I.	13·°	13·°	13·°
Of which temporary hardness	3·5°	3·5°	3·5°
Permanent do.	9·5°	9·5°	9·5°
Chlorides determined volumetrically as chloride of sodium in one gallon.	grs. 11·1	grs. 10·5	grs. 10·8

Bases in solution by carbonic acid.

Iron.	Traces.
Lime	Average quantity.
Magnesia	Rather above the average quantity.

In solution after boiling.

Lime	Rather large amount.
Magnesia	Do.
Chlorides	Already determined quantitatively.
Sulphates	Present, but not in excess.
Nitrates	None.

WELL No. III.

Sensible properties.

Appearance	Perfectly clear and transparent.
Microscopical appearances...	Individual forms of animal organic life, besides the other appearances as described in Nos. I and II.
Odour	Free from odour.
Taste	Has a taste slightly saline.

Chemical properties.

Reaction to test paper	Decidedly acid in the cold.

	Dr. Mayer.	*Dr. Wyndowe.*	*Mean.*
Solid ingredients in one gallon Imperial.	grs. 38·65	grs. 36·60	grs. 37·62
Amount of organic impurity ...	grs. 5· 0	grs. 6· 1	grs. 5·55
Salts	grs. 33·65	grs. 30· 5	grs. 32·07
Hardness to soap test	13°	14·°	13·°5
Of which temporary hardness ...	3°	2·°5	2·°75
Do. permanent	10°	11·°5	10·°75
Chlorides determined volumetrically as chloride of sodium in one gallon.	25°=14·615 grs.	25°=14615 grs.	*Mean* 25°=14·615 grs.
Bases in solution by carbonic acid.			
Iron	Traces.	Do.	
Lime	Average.	Do.	
Magnesia	Average.	Do.	
In solution after boiling.			
Lime	Average.	Do.	
Magnesia	Large.	Do.	
Chlorides	Not determined here.	Not determined here.	
Sulphates	Large.	Do.	
Nitrates	Nil.	Nil.	

WELL NO. IV.

Sensible properties.	
Appearance	Clear and transparent.
Microscopical appearances... ...	As described in Nos. I. and II.
Odour	Free from odour.
Taste	Slightly unpleasant.
Chemical properties.	
Reaction to test paper.	Neutral.

	Dr. Mayer.	*Dr. Wyndowe.*	*Mean.*
Solid ingredients in one gallon Imperial...	grs. 50·95	grs. 50·1	grs. 50·525
Amount of organic impurity ...	grs. 5·90	grs. 5·65	grs. 5·775
Salts	grs. 45·05	grs. 44·45	grs. 44·75
Hardness to soap test	18°	19°	18·50
Of which temporary hardness ...	7°	7°	7·00
Do. permanent	11°	12°	11·50
Chlorides determined volumetrically as chloride of sodium in one gallon	35°=19·461 grs.	35°=19·461 grs.	35°=19·461 grs.
Bases in solution by carbonic acid.			
Iron	More than a trace.	Traces.	
Lime	Large.	Large.	
Magnesia	Average.	Fair.	
In solution after boiling.			
Lime	Average.	Average.	
Magnesia	Very large.	Very large.	
Chlorides	Not determined.	Not determined.	
Sulphates	Very large.	Very large.	
Nitrates	Nil.	Nil.	

RESULT OF ANALYSIS OF WATER FROM WELLS NOS. V & VI.

Sensible properties.

	No. V.	No. VI.
Appearance	Clear	Clear.
Microscopical appearance	Much vegetable and a few animal organisms	Rotatoria plentiful; animal and vegetable life abundant.
Odour Taste	No difference in these respects from the other Wells.	

Chemical properties.

	No. V.	No. VI.
Reaction to test paper	Slightly acid.	Do.
Solid ingredients in one gallon Imperial.	grs. 22·40	grs. 33·15
Amount of organic impurity	grs. 3·55	grs. 6·65
Salts	grs. 18·85	grs. 26·50
Hardness to soap test.	8°	13°
Of which temporary hardness	1°5	2°
Do. permanent	6°5	11°
Chlorides determined volumetrically as chloride of sodium in one gallon.	grs. 4·67	grs. 9·35.

Bases in solution by carbonic acid

	No. V.	No. VI.
Iron	Traces	Traces.
Lime	In small quantity	In small quantity.
Magnesia	In very small do	In very small do.

In solution after boiling.

	No. V.	No. VI.
Lime	Average quantity.	More than average.
Magnesia	Small do.	Very small.
Chlorides	Determined	above.
Sulphates	In small quantity.	Average property.
Nitrates	None.	None.

No. V, though not good, better than other Wells analysed.
No. VI, decidedly bad.

RESULT OF ANALYSIS OF WATER FROM WELL NO. VII.

Sensible properties.

Appearance	Perfectly clear.
Microscopical appearances	Animalculæ present, species not recognizable.
Odour	Free from.
Taste	Nothing perceptible.

Chemical properties.

Reaction to test paper	Faintly acid.		
	Dr. Mayer.	*Dr. Wyndowe.*	*Mean.*
Solid ingredients in one gallon Imperial.	grs. 29·5	grs. 30 85	grs. 30·11
Amonnt of organic impurity	grs. 7·85	grs. 7·65	grs. 7·75
Salt	grs. 21·65	grs. 23·20	grs. 22·42
Hardness to soap test	15°·5	18·°	
Of which temporary hardness	2°·5	3·°	27·6°
Do. permanent	13°	15·°	14°
Chlorides determined volumetrically as chloride of sodium in one gallon.	15·5 —9·0618 grs. 15·75°—6·270 grs.	16°—9·853 grs. chloride sodium.	

Basis in solution by carbonic acid.

Iron	Traces.	Traces.
Lime	Average.	Average.
Magnesia	Traces.	Traces.
In solution after boiling.		
Lime	Average.	Average.
Magnesia.	Small.	Small.
Chlorides.	Not determined here.	Not determined here.
Sulphates	Large.	Large.
Nitrates.	None.	None.

RESULT OF ANALYSIS OF WATER FROM WELL NO. VIII.

Sensible properties.

Appearance	Clear.
Microscopical appearances... ...	Less amount of animal life present, but ascellatoriæ distinctly observed.
Odour	None.
Taste....	None.

Chemical properties.

	Dr. Mayer.	Dr. Wyndowe.	Mean.
Reaction to test paper	Neutral.		
Solid ingredients in one gallon Imperial...	grs. 35·00	grs. 34·80	grs. 34·60
Amount of organic impurity ...	grs. 6·70	grs. 6·70	......
Salts	grs. 28·30	grs. 28·10	grs. 28·20
Hardness to soap test	15°	17°	16°
Of which temporary hardness... ...	3°	3°	30°
Do. permanent	12°	14°	13°
Chlorides determined volumetrically as of chloride of sodium in one gallon.	15·5=9·0613grs.	16°=9·353grs.	15·75°=6·270 grs. of chloride of sodium.

Bases in solution by carbonic acid.

Iron	Traces.	Idem.
Lime	Average.	
Magnesia	Small.	
In solution after boiling.		
Lime...	Average.	
Magnesia	Small.	
Chlorides	Not determined here.	
Sulphates	Large.	
Nitrates...	None.	

RESULT OF ANALYSIS OF WATER FROM WELLS NO. IX & X.

		No. IX.	No. X.
Sensible properties.	Appearance ...	Not clear from numerous minuteparticles.	Clear, but impurity still present.
	Odour	Free from	Free from.
	Taste	Not remarkable ...	Brackish.

Microscopical Appearance.		
Chemical properties.		
Reaction to test paper.	Animal and vegetable, latter more.	Same as No. 9.
Solids in 1 imperial gallon	Acid.	Acid.
Organic impurity	grs. 28·20	grs. 70·10
Inorganic do.	grs. 5·25	grs. 5·70
Total hardness	grs. 22·95	grs. 64·40
Temporary do	14·5°	26·5°
Permanent do	3°	9·5°
Chlorides determined volumetrically in one gallon	11·5°	17·0°
Bases in solution by *carbonic acid.*	9·93820	26·9516°
Iron	Traces.	Traces.
Lime	Small (average)	Very large.
Magnesia	About average.	Rather large.
Bases present after boiling.		
Lime	Small.	Not too large.
Magnesia	Small.	Little above average.
Chlorides	Determined above.	
Sulphates	Fair.	Much above average.
Nitrates	None.	None.

Captain Nelson's Report of the tracts of country on the Kistnah, marked "Unsurveyed and impenetrable" in the Great Trigonometrical Map, Sheet 76 *; with an Introduction by the Editor.*

INTRODUCTION.

The following paper relates to a portion of the district of Kurnool which long remained unexplored by European travellers.

The writer, Captain Nelson, after 17 years hard service, was invalided in 1853 on account of an injury to the knee, and appointed to command the station of Ongole. His activity and energy found but little scope for development in this duty, and in 1854 he applied to Government for leave to explore "certain portions of country on the banks of the Kistnah river, marked on the Trigonometrical* map No. 76, as impenetrable." Leave was granted, Captain Nelson penetrated into this almost unknown land, and found that, though now barren and malarious, the country must once have been green with cultivation, and dotted with populous towns and villages. He was particularly struck with Peddacheroo and Siddapur, a tract of great natural beauty, where ruined forts and cities overlooked tanks of remarkable extent, which had once sufficed to supply thousands of acres with water, and thus aided in filling the exchequer of a powerful race of chieftains whose memory was still preserved by the neighbouring tribes.

On his return, Captain Nelson submitted the report to Government which is now published. He was then on the

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NOTE.—It appears that this is a misnomer for the sheet No. 76, of the Indian Atlas, the details of which are not derived from Trigonometrical Surveys, although the Triangulation of Colonels Lambton and Earnest form its skeleton or framework.—ED.

point of retiring from the service and proceeding to England; but he found himself unwilling to quit India without making an effort to rescue the interesting country which he had explored from the desolation and pestilence which seemed to have claimed it for their own. He obtained permission to cultivate all lands which he could reclaim in Peddacheroo and Siddapur, rent-free, for 10 years, and with a grant of Rupees 3,000 from Government he addressed himself to his perilous task.

Half the little party who accompanied him from Nellore died of fever within twelve months, and the rest fled. Gradually, however, his kindliness and wisdom conciliated the Chenchuwars who wandered about the neighbourhood, and they began to give up their savage modes of life and aid him in his labours. Success was beginning to dawn upon his efforts, when, in 1859, he was obliged himself to succumb to the deadly climate. He was struck down by rheumatic fever; his lower limbs were paralyzed, and his shattered constitution compelled him to leave every thing and go to England in search of health.

His affairs did not prosper in his absence, and when he returned, married, in 1861, he found the sources of his income diminished, and labour harder to obtain than ever. In each successive year the feeble group that surrounded him was literally decimated by disease. No longer alone in the world, he had the interests of others to care for, and in March 1864 he found himself obliged to relinquish the great object of his life, and wrote as follows: "I have wasted 10 precious years and spent a great deal of money. I now have a family; and whatever quixotic notions I might once have entertained, I now confess to one sole motive, and this the acquisition of property for those I shall leave in the course of time; and as it is quite clear that neither honour nor wealth is to be obtained here, I have applied to Government for permission to reside on the Neilgherries, to endeavour to retrieve my fortunes in planting Tea and Chinchona, which has been granted."

The story has a sad ending. Captain Nelson died within a few months after he had left Kurnool.

CAPTAIN NELSON'S REPORT.

I proceeded to the river Kistnah *via* Pothacamore Durshee, Chenaloor, and Vencatareddy Polliem, called Ragapolliem: carts would go no further; so packing my supplies on bullocks I proceeded by the Lumbadi track to Ragaman Pentah. It may here be stated that a Pentah is a cattle station.

Between Vencataraja Polliem and Ragaman Pentah you pass by a breach made by water through an artificial dam or bund of enormous strength, which must have been constructed to collect the great body of water which passes down the large Nullah that intersects the district. The bund, which is about 60 feet high and 80 paces in depth or width, stretches across the neck of a deep valley, the area of which is probably about 500 square acres.

The pent up water, as appears only natural to suppose on looking at the site, made a clean breach one day through the centre of the bund which crosses the Nullah, and the water resumed its course. What must have been the bed of this lake is now covered with jungle.

Unless the features of the country are much changed, it is impossible to understand why such a great work was ever attempted, as the country all around is rocky and hilly, and under no circumstances could produce crops.

If it were intended for the irrigation of the rich lands about Vencataraja Polliem, it seems singular that the site for a reservoir should have been chosen so far off as 5 miles, when the same Nullah could have been dammed under far more favorable circumstances, though not capable of storing so large a supply of water, close to their doors.

About Ragaman Pentah the hills are high and precipitous, covered with long grass and dwarfish trees, intermixed with which are here and there found a good timber tree called Rupa, or Vaypa Maram.

This tree, which occurs more frequently in the north and west, as far as the Kistnah, is, I believe, well known in Madras. The Vaypa Maram at Madras, and to the southward, is the Margosa tree, called in Bengal the Neem. The bark is made into excellent rope by the Lumbadi people,--not so strong a rope as cotton, they tell me, but capable of wear and tear for a year. From the same fibre a good gunny is made. I have forwarded samples of both, with wood, leaves, and pods of the tree to the officer in charge of the Central Museum.

From Ragaman Pentah we proceeded to Nataca Pentah, about four hours journey: we had to ascend a high hill about a mile, or a mile and a half from Ragaman Pentah.

The country is exceedingly rugged—and one has to pick one's way among fragments of sand-stone, the whole surface of the country being covered with the same. The jungle is composed chiefly of dwarfish trees of no value.

When I passed over this tract, the grass had been burnt, the trees were leafless, and the whole scene as sterile and inhospitable as any in the extreme north of Europe during the Arctic winter, from the effects of an extreme temperature. From Nataca Pentah to Allotta is about four hours journey.

The country for the most part was similar in feature to that already described, only, if possible, more stony.

About two miles from Allotta, you descend by a winding ghaut about 800 feet. The road is composed of loose fragments of sand-stone, and, except to Lumbadi cattle, is almost impracticable.

From the ghaut you have a good view of the surrounding country, the little Fort of Allotta standing in the plain beneath you, about one mile from the river, which here forms an elbow, changing its course from easterly to north, north-east—much as it is sketched in the great maps.

The country on the other side of the river is nearly devoid of trees and slightly undulating: the high hills, sketched in the map on the left bank of the river after its course becomes northerly, do not exist. The river is turned to the north by a range of hills on the right bank of the river, running north and south. The appearance of the Kistnah here is very disappointing. As far as it can be traced by the eye, it appears a gigantic ravine or gully, with steep and almost precipitous walls of indurated mud, and flows about 1,000 or 1,500 feet below the level of the surrounding country. There was little water in the river at this time (March), and what there was lay in pools or formed rapids, giving the river much of the character of the famous salmon streams of the north of Europe.

The Fort of Allotta* is of stone, 80 paces square, with walls 12 feet high: it is admirably placed with a view to the defence of the river at that point: outside the Fort the ruins of a town of some size are in existence, the houses and streets of which were entirely composed of slabs of rock. There are the remains of four large bowries which have been used to irrigate the land by picottah; but it never could have been a producing country, and the Fort must have been built either as an out-post to dispute the passage of the river, or as the stronghold of some marauding clan.

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* Vide Note 2.

The river now-a-days is crossed three miles to the north-west of Allotta: there are two basket boats manned by Chenchowars in the employ of the Pulari contractor, who lives at Atmacore: the boatmen get monthly pay, and the profits of the ferry are paid to the contractor.

A large nullah or ravine empties itself into the river at this point, and the great deposit of alluvium, dried at this season and cracked into cubes by the intense heat of the sun, with yawning fissures from four to six feet in depth, testified to the power and violence of the stream during the monsoon. I observed jungle rubbish, *i. e.*, dead grass, roots of bamboo, &c., suspended in the forks of trees, 100 and 150 feet above the level of the bed of the river. High hillocks of white river sand are thrown up by the same cause, and give a sea-side appearance to the shore. The bed of the river and the boulders and rocks on the banks are of limestone.

From Allotta to Pentahbant Pentah, ascending the same ghaut, we proceeded as far as Yerra Pentah, and then rode west to Pentahbant Pentah, three hours journey from Allotta; the features of the country not differing from what has been before described. The surface of the country is covered with sand-stone and hornblende in fragments, from the size of a tea canister to that of a seaman's chest, over which you pick your way. Vaypa-maram and Woodapple are the trees which oftenest occurred. Pentahbant Pentah is situated in a maidan of red soil about 400 acres square, near the margin of a nullah running from west to east. From Pentahbant Pentah, we proceeded by the Lumbadi tract to Palotta, and from thence to Nakul Pentah.

The country between these three places is, comparatively speaking, flat—a rich red soil, free from stone, covered with jungle grass two feet in height, and the Vaypa tree plentiful and of large size. Some years ago this land was tilled, but the spot being so remote from any market, and the intervening country so rugged, it was found a profitless speculation. From Nakul Pentah we proceeded to Yellagal Pentah, over a very rocky country; and from Yellagal Pentah to Arepentah, which I have marked in my map. From Arepentah to Shigarum pagoda, the country becomes wilder and more mountainous, and resembles a good deal the hilliest part of Coorg. Shigarum pagoda, which is built on the point of the highest hill within view, is reached by a stone road-way and stairs, about 15 paces broad, which winds round the hill.

The pagoda itself is an insignificant building and dilapidated; but from a platform on the roof a superb view of the surrounding country is obtained.

The dark gloomy looking walls of the Kistna mark the tortuous windings of its course, and at one favorable turn of the river you catch a glimpse of the stream, flowing like a great sewer deep down between its high banks. In the valley before us we saw glittering in the rising sun the golden balls which flank the top of the Holy Temple of Shreechalum or Purwuttum.*

The road to Purwuttum, which is of hewn stone, is a continuous descent and about three miles in length: nearly every stone or stair of the road is covered with written sentiments of devotion. There are several small dewals on the road side, besides the pagoda of Ullokasher.

Purwuttum must once have been a vast city; but nothing now remains of its former glory except the Temple. The ruins of stone bowries of great beauty, and lines of stone wall that every where can be seen standing out of the thorn jungle, still give an idea of a time that has long since passed away. Like all old ruined towns, Purwuttum is most unhealthy. A deadly fever appears to prevail there all the year round. The great festival at Purwuttum is held in March and April, perhaps the healthiest time of the year: still the amount of sickness and suffering among the pilgrims is very great.

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* Vide Note 3.

The Temple of Purwuttum faces east and west: the east face is the principal entrance: a stone road commencing at the east tower leads in an easterly direction to the river, distant about 1¼ mile. It winds down a very steep hill. There are several small dewals on the way; and a little pagoda, every stone of which is elaborately carved, stands near the river. The Kistna here comes from the north north-west, and takes an abrupt turn again to the north and by west.

The banks on the opposite side of the river are precipitous and are not accessible. From Purwuttum another stone road proceeds westerly to the river, distant about a mile as the crow flies; but the descent to the river being too abrupt, the road slants down the heights running parallel to the stream for about two miles, making the distance from the Temple to the river three miles. Here there is a ferry, and a stone road, and stairs ascend the heights on the opposite side of the river, from whence there is a road to Hyderabad. A large nullah on either side of the stream empties itself into the Kistna. At this point, a deep deposit of alluvium and hillocks of sand are found at the mouth of all these nullahs, covered for the most part with the tall reed of which the native pen is made. Course of the river south-west to north-east, by compass.

Crossing the river, I marched due west into the tract of country called impenetrable, and halted in a large nullah about 5 miles distant. After mounting the heights on the banks of the river, the country is, comparatively speaking, flat; the soil is red, covered with jungle grass; the blackwood tree is common but of no size, the average diameter being about 12 or 14 inches. Proceeding west, the jungle becomes much thicker, containing Bamboo, Blackwood, Rosewood, Vayapa-maram and Woodapple. Having penetrated about 15 miles due west from the ferry, I was forced to retrace my steps, after waiting some days for supplies and coolies, for which I had written in vain to the Tahsildar of Atmacore. We returned to Purwuttum, and from thence marched to Collum nullah. We proceeded by the stone road-way and steps, which lead from Shigarum pagoda for about ¾ of a mile, and then turned off to the south and proceeded for about 3 miles on a road partly paved and partly earth with slight ascents and descents, but on the whole rising, till we passed through an arch-way in ruins, which we found on the crest of an exceedingly steep hill. Stone stairs wind with many turnings down to the Collum nullah. Collum nullah is a deep gully, the bed of sheet rock, and, when I visited it, quite dry.

The banks, which are of indurated mud, are very steep, and the bed of the nullah is certainly not less than one thousand feet below the level of the country through which it winds its way. The banks of the nullah seen from above much resemble those of the Kistna. Half way down the heights there is a pagoda, and another one stands on an acre of level ground close to the beds of the nullah. Pilgrims make this a resting place. From Collum nullah to Peddacherro the road (stone stairs) rises from the nullah and runs to the south-east, ascending the hill-side on the left bank of the nullah till the high levels of the surrounding country are reached. Proceeding south-west by gentle ascents and descents, but on the whole descending, you pass through a jungle of bamboo and timber of weak growth, until you emerge on the broad plain of Peddacherro. Peddacherro is a place of great natural beauty, and you cannot help asking yourself, why, in the place of the few Chenchowars' huts, there is not a rich and populous village. It is situated in the head of a large valley. A maidan of about 50 acres, dotted with fine banian and mangoe trees and a dry tank—about 60 acres, in extent—all beyond jungle, bamboo and timber. This is the first time in 12 years that the tank has become dry, although there is a breach in the bund.

On enquiring why this beautiful country was not cultivated, I was told that people were afraid of coming here to live, on account of fever. It has become feverish in the last 30 years. Formerly it was healthy : there was a town at Peddacherro, and there are the ruins of a stone fort. Notwithstanding the fever, the Lumbadies have many Pentahs in the neighbourhood. I observed, however, when their women and children came to the tank for the scanty supply of water which the little wells they had dug in the bed of the tank afforded, that a great many of them had the pot-belly of old fever subjects, and I had many applications for medicines to cure hopelessly indurated spleens, which showed in the wasted attenuated frames as big as foot-balls.

From Peddacherro I again penetrated the jungle, and marched north-north-east to a fortified hill, called Gazzelcondah ; the road was not practicable for laden bullocks and was almost a continuous descent. We halted in a nullah full of wild mangoe trees. There was a Pentah in the neighbourhood. From thence I proceeded to the river, a further distance of 4 miles, the road continuing to descend to the river's edge. I saw no timber of any size. Course of the river from south-west to north-east.

The banks of the Kistna here form a much more gradual slope than I have before described. The country on the other side of the river appeared open and almost devoid of timber. We returned to Peddacherro, and proceeded to Siddapore* through a dense bamboo jungle in which I observed some blackwood, rosewood and a few teak trees of small size. Timber was being felled as we passed through. The road through the jungle is level, broad and soft; indeed, there is not a stone to be seen. All this land appears very rich and ought to produce more profitable crops than bamboo and long jungle grass.

Five miles from Peddacherro, we halted on the margin of a nullah: so far you could drive a coach and four. Next morning the road became more broken and uneven. After proceeding about 3 miles, we passed through another archway in ruins, and soon came upon another stone road-way and stairs winding down a gorge in the hills to the pagoda of Nagalooty, which is seen over the tree tops in a ravine full of large mangoe trees at the bottom. Here you get a fine panoramic view of the low country stretching away towards Kurnool. Nagalooty pagoda is buried in an avenue of large mangoe trees. On the margin of a nullah there are two stone wells and three small dewals, besides the great Pagoda. a Priest (Pushari) lives here all the year round.

4. From Nagalooty to Siddapore you travel through a bamboo jungle—country flat—soil red. The Fort of Siddapore stands on an elevated piece of ground and is regularly built of hewn stone, with a ditch round it. I rode into the Fort over a breach in the wall; the breach is the effect of time and weather, not of service. The Fort and ditch and the remains of a town outside, Pagodas, Edgahs and other buildings are all grown over with thorn jungle. There is a stone godown here for storing grain. From the Fort walls, I saw the dry bed of the Siddapore tank of large size, but the bund delapidated and the bed very shallow. There is a little village of Chenchowars here.

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* Vide Note 4.

From Siddapore I proceeded to Atmacore, distant 10 miles; the first four miles are thick bamboo and thorn jungle. From Atmacore I again made for the river; the latter half of the road was so rugged that it was impracticable for cattle of any description.

The country on either side of the river slopes down somewhat more gradually to the river, and the walls of indurated mud which, further to the east, look almost like artificial works, are no longer seen.

Being now satisfied that the object for which I came was accomplished, and that there was no timber (of sufficient size to make it valuable) in the "impenetrable tract," and that, moreover, if it existed, the nature of the country would be an almost insuperable bar to its removal, I returned to Ongole.

1. Note.—In the dry and hot seasons, when grass is scarce in the inhabited country, countless herds of cattle are sent from Doopaud and the country to the south and east of Doopaud to these Pentahs, which are always chosen as the best grass districts, and to the neighbourhood of an unfailing pool or spring in some nullah. Here the cattle remain until July, when fodder becomes abundant in the plains, and then they are driven back to the south, and are dispersed among their numerous owners until December or February, according to the season, when each herd is once more collected and driven off to a Pentah in charge of two herdsmen, who remain with them in the jungle, or hand them over to the charge of the Chenchowars. In the case of an entire herd belonging to one owner, when they are kept as *breeding stock,* they are only sent home for a month in the year to prevent their becoming perfectly wild—these are never milked.

These thinly inhabited districts, both on the right and left bank of the river, are also much frequented by the Lumbadies who, when not engaged in the carrying trade, and during the three hottest months, when they do no work, make them their Head Quarters,—moving from Pentah to Pentah in search of the best grass and water.

Their cattle, which are mostly bred in the neighbourhood of Amrabad (East Longitude 78°54′) in and about 30 miles from the left bank of the river, are remarkably fine; stronger, hardier and more active than the famous breeds of Nellore or Mysore. They have a long horn, breed mostly a brown red, approaching the horse color, bay, and have generally bold faces: their price averages from 16 to 20 Rupees each. I am assured that a first class bullock will carry a load of 284 lbs., and I believe I have seen them carrying as much over this rugged country. An agent from Bellary bought eight of these beasts on the part of the Commissariat at Pentlabant Pentah, when I was there, measuring them by a standard before purchase. The Doopaud breed of cattle which was once famous appears to have entirely degenerated. No attention is paid to breeding and the same blood is continued from generation to generation. They are very small sized, leggy and small bodied, more like deer than cattle, and show plainly enough in their uniform appearance and small bone, how the breed has become deteriorated.

With any attention to select breeding, these districts could produce admirable cattle, as the supply of grass all the year round is inexhaustible, and a hilly rocky country is favorable to the development of strong limbs and feet, activity and general hardihood.

Spotted deer, &c., are very numerous, and consequently the herds do not suffer severely from tigers. Altogether it is a first rate cattle country.

2. Page 130.

From this place, and as far as Nagalooty, the Poolery tax is raised by a contractor who pays 600 Rupees per annum for it.

Emam Sahib, the contractor, generally collects two thousand Rupees per annum, and if untiring energy in travelling from Pentah to Pentah at all seasons of the year and in the face of a deadly fever, ought to go for any thing, he certainly fairly earns his handsome profit. He appears popular among the Lumbadies and Chenchowars, which is much in his favor, but I heard many complaints from the latter of the rapacity of his peons, who, even in this season of scarcity, were laying an embargo upon the wild mangoes, the only food which these poor people had to subsist upon, and which of course had nothing to do with the Poolery contract. The Chenchowars might give trouble.

PURWUTTUM.

Note 3, Page 132.

In 1839-40, when Kurnool fell, the Commissioner was induced to get into his palanqueen and visit this extraordinary place.

I am told that he then gave the Temple to one Sunkaray Charry, a Temple Brahmin, living in the neighbourhood of Jungoovarpully, reserving, however, the endowments on the part of Government. The Temple expenses amount to two thousand Rupees per annum, the assets generally to between 7 and 10 thousand Rupees per annum. Sunkaray Charry, lets the place to a contractor, a Brahmin, who defrays the expenses of the Pagoda, servants' wages, &c., and pays a rent of 500 Rupees per annum to Sunkaray Charry. This contractor, a man of no religious sentiment, has brought the place down a great deal by his irreligious conduct, urging the Poojaries to dig in the most sacred spots for treasure, and establishing cordons of tax-gatherers, one within another, in the country round the Temple and on all the roads by which the pilgrims arrive.

The feast of Purwuttum lasts for two months; *i. e.*, from the new moon in February until the new moon in April. All pilgrims, except Byragies, religious medicants, &c., pay about sixty Rupees per head per mensem for the privilege of residing within the temple enclosure, and visiting daily the holiest part of the temple in private prayer. Four servants belonging to the contractor, viz., a Brahmin, a Byraghee and two Teloogoo Poojaries, remain in close attendance during the day near the images before whom offerings are laid. The said offerings, which generally consist of eyes and limbs in solid gold, offered either in gratitude for a supposed cure, or as an inducement to perform one, are, on the retirement of the devotee, seized and placed in a treasure chest which is kept on the spot.

When the temple is closed at 9 P. M., the four abovementioned servants are carefully searched, and the treasure chest is carried to the Cutcherry, just outside the temple. Next morning the seals are broken and the contents of the chest valued, &c. Each pilgrim desirous of entering the temple for private prayer is provided with a ticket at the Cutcherry and has an arm stamped, for which he pays one Rupee eight Annas. Very poor people who cannot afford the personal interview pay eight Annas for the privilege of looking at the outside walls, a sight well worth the money, for the walls of the Temple enclosure, 300 paces by 250, and about 20 feet in height are built of stones, every one of which is carved with a tableau in *Alto Relievo* representing the combat of men and animals. The two temples within the enclosure are entirely covered with copper gilt.

SIDDAPOOR.

Note 4, Page 137.

Riding along the bund of the Siddapoor tank, I observed that it does not now occupy more than a fifth of the space it once did. A gigantic bund stretches away to the south-east, which I am told was breached by the overflowing water of the tank about 50 years ago. My informant, who holds the office of Curnum at the villages of Siddapoor and Peddacherroo, and whose family appear to have held the same post for many generations past, states that it is on record that the bund cost 40,000 Rupees, and that the revenue derived from the tank alone was enormous. He gave me some interesting details of the history of Siddapoor or Tonsnager. This was the place from which were derived the revenues, that supported in wealth the 350 dancing girls, who once formed the yearly procession that marches round the walls of the Holy Temple of Purwuttum, and this place supported also the same number of carpenters and silversmiths who were attached to the Temple. In 1848, Billakalla Gooroo Kistapah, my informant's uncle and Curnum of Siddapoor, conceived the idea of restoring the place to its former importance. He communicated with the Commissioner of Kurnool, who gave him every encouragement, and told him that he should have what land he liked at the nominal rent of 8 Annas a cawny, if he could establish a village and cultivation at Siddapoor. Accordingly, GoorooKistapah raised a sum of 700 Rupees and travelled from village to village in the districts of Kurnool and Bellary in search of volunteers, who would join him in his attempt to reclaim these lands. A party of 80 persons were collected, and in March 1848 they squatted on the site of the old Town of Siddapoor; some jungle was cut down, and in July, 20 acres of paddy were planted. A fine old stone bowree was cleared of rubbish, cleaned out, and the water declared excellent. This bowree was resorted to because the squatters thought that the tank water coming from the surrounding hills was so saturated with decomposing vegetation that it would probably induce the deadly fever of which they had all heard so much. The health of the squatters was excellent for about 10 months from the date of their arrival, when fever broke out, and thirty persons were burned or buried in a very short space of time. The rest were panic-struck, and every one who had strength fled.

Poor Gooroo Kistapah was among the first victims, and his son on his death became Curnum of Siddapoor and Peddacherroo, which post he filled until about three months ago, when he also died of fever, and the present Curnum, his cousin, was appointed. There can be no doubt that this unhealthy jungle is, and has been, for many years past slowly extending. Trees grow when men sleep, and although the intense heat of March, April and May arrest vegetation, the heavy rains in June, July and August produce a yearly increase of jungle which man makes no attempt to restrict. In short, the people of this district are and have been for years retiring before the jungle and its concomitant fever; and the jungle and fever will continue to advance, until a vigorous stand is made against them, the jungle cut down and the land cultivated.

Enumeration of the snowy peaks hitherto measured in the Himalaya. By Robert de Schlagintweit, Professor at the University of Giessen.

The valuable memoir "The Trigonometrical Survey of India," by Major J. T. Walker, contained in the Journal of the Asiatic Society of Bengal, 1862, No. I., pp. 32-48, enables me, in connexion with the data published by me in the second volume of our "Results of a scientific mission to India and High Asia," to give here an enumeration of those snowy peaks, which have hitherto been measured in the lofty mountain-chain of the Himalaya.

In order to render this enumeration useful in a scientific point of view, as well as for practical purposes, I have added to each peak, besides its latitude, longitude, and height, also a name. The necessity of finding proper names for the peaks is not only of importance for trigonometical operations in general, but also for every geographical detail. Many of the difficulties, alluded to by Major Walker in para. 58 of his memoir, "which the compiler meets with in the identification of peaks, whose positions have been determined by different persons, after long intervals, or from different points of view under the disadvantages of altered aspects," would greatly be diminished—though they will never entirely disappear,—if every peak should have its definite name.

Although many a peak of striking aspect is distinguished by a name given to it by the natives, which repeated inquiries prove to be no arbitrary one, yet such a designation is wanting for a considerable number of peaks, especially when they are situated in the higher, uninhabited regions. As it may not be generally known, I may mention here, that also in the Alps many peaks had not been designated by names before the time when a livelier sense of the necessity of geographical precision became general. It may be remembered, that Saussure, in his first scientific exploration of the Alps, found Mont Blanc without a name well defining the peak, its individuality being merged along with the surrounding region under the general appellation of "Monts Maudits."

Whenever in the Himalaya designations for a peak were wanting, we endeavoured to supply the deficiency by those of any well defined object, such as passes, glaciers, valleys, rivers, springs, etc. in their immediate neighbourhood ; for in the Himalaya such objects are sufficiently distinguished by popular and characteristic names, with which we had every opportunity during our travels of getting a correct and intimate acquaintance.

Every peak measured by the Great Trigonometrical Survey, whether its name be known or not, is marked with a number or an initial. With reference to the various characteristics adopted in such cases by the Great Trigonometrical Survey, I hope not to commit an error, when I state it here as my conviction, that, though Major Walker does not clearly express himself about this point, the Roman numbers, viz. I, II, III, etc. are signs, which the G. T. Survey wishes to be considered as definite ones, whilst all other characteristics, as *E. G. A*, a, L, B, γ. etc., are provisional signs, which the G. T. Survey will replace at a later period by definite Roman numerals.

With reference to the accuracy with which the peaks contained in this enumeration are measured, we have to distinguish three degrees.

I. The peaks marked with Roman numerals, as I, II, III, etc. are measured with the first degree of accuracy : even a later re-measurement will not alter to any appreciable amount the results obtained. See Major Walker's memoir, paras. 80 and 81,

II. The latitude and longitude of peaks measured with the second degree of accuracy is correct within 10 to 15 seconds, and the height within 70 to 90 feet.

III. The latitude of the peaks measured with the third degree of accuracy may be wrong within 2 to 3 minutes, the longitude within 3 to 6 minutes, and the height within 100 to 200 feet. None of the peaks of this category have hitherto been measured by the G. T. Survey.

Besides, the geographical co-ordinates of all the peaks hitherto measured in the Himalaya, depend upon the correctness of the following data :

1. On the latitude of the G. T. Station of Kalsanpur, for which the value of 24° 7′ 11″·26 is adopted.

2. On the longitude of the Madras Observatory, for which I have adopted the value 80° 13′ 55″·5 East of Greenwich, in conformity with the Admiralty and Royal Astronomical Society. The old value for the Madras Observatory, as adopted by the G. T. Survey is 80° 17′ 21.″

3. On the mean sea-level as observed in Kydd's dockyard at Calcutta.

The peaks contained in the following enumeration are arrayed according to geographical provinces, and within them from East to West. Among the 216 peaks contained in the enumeration, 17 exceed the height of 25,000 feet, 40 the height of 23,000 feet, and 120 the height of 20,000 feet. One of the 216 peaks actually reaches the height of 29,002 feet (Gaurisankar, or Mount Everest), and another the height of 28,156 feet (Ranchinjinga West). The relative number of the other peaks exceeding the height of 20,000 feet, are :

Relative Numbers.	From Feet	To Feet.	Relative Numbers.	From Feet	To Feet.
2... ...	58,000	27,000	12... ...	24,000	23,000
5... ...	27,000	26,000	27... ...	23,000	22,000
8... ...	26,000	25,000	20... ...	22,000	21,000
11... ...	25,000	24,000	33... ...	21,000	20,000

THE PEAKS HITHERTO MEASURED IN THE HIMÁLAYA.

A. Eastern Himálaya.

I. *Bhután.*

The peaks 5, 7, 9 and 10 are measured with the first degree, peak 8 with the second, and the other peaks with the first degree of accuracy.

No. Curr.	Name of the Peak (1) and sign of the G. T. Survey.	Geographical Co-ordinates.			No. Curr.	Name of the Peak and sign of the G. T. Survey	Geographical Co-ordinates.		
		Lat. North ° '	Long. East ° '	Height Eng. Feet			Lat. North ° '	Long. East ° '	Height. Eng. Feet.
1.	Dal-La East	27 52·1	92 38·6	21,435	6.	Chóra	27 42·2	89 14·5	22,720
2.	Dal-La West or Giant	27 50	92 34	22,495	7.	Gipmŏ́chi II	27 16 5	88 53·2	14,518
3.	Théme-Ri.	27 48·7	92 28·5	20,480	8.	Forked Dónkia...	27 52	88 51	20,870
4.	Oámla...	27 36	92 7	22,430	9.	Pauhắnri or Dónkia III	27 57·0	88 49·7	23,186
5.	Chamalhári I	27 49·7	89 15·3	23,944	10.	Chóla, or Chumúnko IV ...	27 27·5	88 46·2	17,325

II. *Síkhim.*

The peaks 2, 4, 5 and 6 are measured with the third degree, the peaks 3, 7 and 8 with the second, and the other peaks with the first degree of accuracy.

No. Curr.	Name of the Peak (1) and sign of the G. T. Survey.	Lat. North ° '	Long. East ° '	Height Eng. Feet	No. Curr.	Name of the Peak and sign of the G. T. Survey	Lat. North ° '	Long. East ° '	Height. Eng. Feet.
1.	Guareám V.	27 34·2	88 45·2	17,572	8.	Pandĩ́m *D* 2.	27 42	88 18	22,581
2	Tómocháms...	27 56	88 43	21,000	9.	Pandĩ́m VII.	27 34 6	88 12·2	22,017
3.	Kinchingháu	27 56	88 40	22,750	10.	Mărsíngh VI.	27 30 7	88 16·1	19,146
4.	Changokháng	27 53	88 38	20,600	11.	Kanchinjínga East VIII.	27 41·5	88 8·4	27,815

(1.) Remarks for the transcription of the names: vowels and diphthongs as in Italian and German: ă = u in " but;" ã = an in the French " gant." Consonants sound as in English. The sign, marks the syllable to be accentuatedMorshiadi.

No. Curr.	Name of the Peaks and sign of the G. T. Survey.	Geographical Co-ordinates. Lat. North °	'	Long. East °	'	Height. Eng. Feet	No. Curr.	Name of the Peaks and sign of the G. T. Survey	Geographical Co-ordinates. Lat. North °	'	Long. East °	'	Height. Eng. Feet
5.	Chomiomó	28	1	88	31	22,700	12.	Kanchinjínga West IX ...	27	42·2	88	8·0	28,156
6.	Tắkcham	27	44	88	30	19,473	13.	Kábru X	27	36·5	88	5·8	24,015
7.	Pandím *D* 3	27	44	88	28	19,244	14.	Jáunu XI	27	40·9	88	1·8	25,304

B. Central Himálaya.

Nepál.

The peaks 1, 40, 41 and 42 are measured with the third, all the other peaks with the first degree of accuracy.

No. Curr.	Name of the Peaks and sign of the G. T. Survey.	Lat. North °	'	Long. East °	'	Height. Eng. Feet	No. Curr.	Name of the Peaks and sign of the G. T. Survey	Lat. North °	'	Long. East °	'	Height. Eng. Feet
1.	Yángma	27	55	87	52	26,000	22.	Barathór West XXXV ...	28	32·2	84	4·1	24,718
2.	Sihsur XIII...	27	53·4	87	4·5	27,799	23.	Morshiádi XXXVI ...	28	35·1	83	58·5	24,780
3.	Chamláng East XIV... ...	27	46·5	86	58·0	24,020	24.	Morshiádi XXXVII ...	28	29·7	83	·0	22,964
4.	Chamláng West XVI ...	27	45·3	86	48·5	22,215	25.	Morshiádi XXXVIII ...	28	29·9	83	55·9	22,986
5.	Gaurisánkar, or Mount Everest XV	27	59·3	86	54·7	29,002	26.	Morshiádi (2) XXIXX ...	28	35·7	83	48·4	20,522
6.	Sankósi XVII ...	27	45·3	86	33·5	22,826	27.	Morshiádi XL	28	31·1	83	47·5	23,641
7	Sankósi XVIII	27	52·9	86	28·5	21,987	28.	Morshiádi XLI...	28	39·3	83	42·9	22,471
8	Sankósi XIX	27	58·3	86	25·1	23,570	29.	Dhavalagíri, or Dholagiri XLII	28	41·8	83	28·7	26,826
9	Sankósi XX	27	57·9	86	18·3	23,447	30.	Naráyani XLIII...	28	45·8	83	22·4	25,456
10	Sankósi XXI	27	57·5	86	5·7	19,560	31.	Naráyani XLIV	28	45·2	83	21·8	25,299
11	Jijíbia East XXII	28	7·7	85	51·3	21,853	32.	Naráyáni XLV	28	44·0	83	20·9	24,912

(2.) Major Walker gives as the height of this peak in his memoir 26,522 feet, which is evidently a mis-print for 20,522.

12.	Jibjbia Central XXIV ...	28	10·4	85	45·9	22,891	33.	Naráyani XLVI	28	44·1	83	17 9	25,095
13.	Jibjíbia North XXIII ...	28	21·1	85	46·0	26,305	34.	Naráyani XLVII	28	40 5	83	15·7	23,565
14.	Daibúng XXV	28	15·4	85	30·2	23,762	35.	Naráyani XLVIII	28	43·9	83	11·7	24,181
15.	A'ku North XXVI ...	28	23·5	85	6·8	24,313	36.	Naráyani XLIX	28	44·9	83	7·9	23,799
16.	A'kuSouth XXVII	28	20·7	85	4·0	23,313	37.	Machipúcha, or Naráyani L	28	44·6	83	6·1	21,727
17.	Yássa South XXVIII ...	28	26·1	84	37·4	25,818	38.	Naráyani LI	28	46·0	83	5·0	21,472
18.	Yássa Central XXIX ...	28	30·2	84	33·1	25,729	39.	Chaubíssi LII	28	49·7	82	36·1	19,415
19.	Yássa North XXX	28	33·0	84	32·7	26,680	40.	A'pi LIII...	30	0	80	57	22,799
20.	Barathór East XXXIII	28	29·4	84	10·5	22,947	41.	Kunlás East	30	13	80	54	21,699
21.	Barathór Central XXXIV...	28	32·1	84	6·4	26,069	42.	Kunlás West	30	13	80	53	22,513

C. WESTERN HIMÁLAYA.

I. *Kămáon.*

The peaks 1, 2 and 3 are measured with the third degree, the others with the first degree of accuracy.

1.	Chaudáns East...	30	6	80	27	19,569	8.	Nánda Dévi West LVIII...	30	22·5	79	57·4	25,661
2.	Chaudáns West	30	7	80	24	19,171	9.	Nánda Dévi Central LIX	30	22·6	79	57·3	25,587
3.	Pāch Chúli South	30	10	80	18	20,479	10.	Trissūl East LX	30	16·2	79	51·4	22,342
4.	Pāch Chúli Central LIV	30	12·9	80	24·7	22,673	11.	Trissūl West LXII ...	30	18·7	79	45·7	23,382
5.	Pāch Chúli North LV ..	30	15·2	80	21·7	21,471	12.	Unknown LXI	30	30·9	79	51·1	23,092
6.	Nánda Khāt LVI... [LVII	30	16·9	80	3·2	22,538	13.	Nandákna North LXIII	30	22·2	79	42·3	19,916
7.	Nánda Dévi East, or Látu	30	22·0	79	58·9	24,417	14.	Nandákna South LXIV ...	30	21·0	79	42·2	20,773

II. *Gǎrpvál.*

The peaks 2 and 4 are measured with the third degree, the peaks 1, 3, 5, 6, 7, 8, 11, 15, 16, 22, 25, 35, 37 and 38 with the first, and all the other peaks with the second degree of accuracy.

No. Curr.	Name of the Peak and sign of the G. T. Survey.	Geographical Co-ordinates. Lat. North ° '	Long. East ° '	Height Eng. Feet.	No. Curr.	Name of the Peak and sign of the G. T. Survey.	Geographical Co-ordinates. Lat. North ° '	Long. East ° '	Height Eng. Feet.
1.	Unknown LXVI.	30 41·1	79 41·5	22,093	25.	Bhūs, or Srikánta LXXVI..	30 57·4	78 47·4	20,149
2.	I'bi Gã̄nun East	30 56	79 36	24,200	26	Néla East	31 11·2	78 45·1	19,655
3.	I'bi Gã̄nun Central LXVII.	30 55·2	79 34.8	25,373	27.	Néla West	31 11·9	78 40·2	19,086
4.	I'bi Gã̄nun West	30 59	79 33	24,000	28.	Chétkul *β*	31 20·3	78 41·5	19,338
5	Nalikánta LXVIII	30 43·9	79 23·5	21,661	29.	Chétkul *D*...	31 20·2	78 39·7	19,813
6.	Bádrinath East LXIX ...	30 44·3	79 15·9	23,210	30.	Chétkul *x*, or *O*	31 21·3	78 36·1	21,517
7.	Bádrinath Central LXX ...	30 43·4	79 14·5	22,511	31.	Chétkul *P*. or *D*.	31 20·1	78 35·3	21,159
8.	Bádrinath West LXXI...	30 46·7	79 13·6	22,347	32.	Chétkul ఎ	31 19·6	78 34·4	21,211
9.	Rúdru (I, or *γ*)	30 58·6	79 4·8	21,384	33.	Damdár East	31 8·9	78 35·5	19,577
10.	Sắrga Rúer (*β'*)	20 59·7	79 4·8	22,906	34.	Damdár West	31 8·8	78 34·9	19,628
11.	Kídarnath, or Mahapánth	30 47·9	79 3·2	22,790	35.	Bandarpūch LXXVII ...	31 0·2	78 32·3	20,754
12.	Shíppur East ... [LXXII	31 0·8	79 3·4	22,076	36.	Changsákha *D''*	31 13·2	78 31·0	20,431
13.	Shíppur West	31 2·5	78 59·6	20,933	37.	Jamnóki LXXVIII	31 0·4	78 80·7	20,038
14.	Bhagiráthi (ఎ or 2) ...	30 56·5	78 59·1	21,390	38.	Sargoróin LXXIX... ...	31 6·1	78 29·1	20,405
15.	Tharlasã̄gar South LXXIII	31 51·6	78 58·8	22,582	39.	Báspa న'	31 14·1	78 31·1	20,609
16.	Tharlasã̄gar North LXXIV.	30 51·7	78 58·8	22,628	40.	Báspa స	31 15·5	78 25·2	19,193
17	Nélong (R')	31 6·6	78 54·2	19,694	41	Báspa *R*	31 14·4	78 23·8	19,285
18.	Srikánta No. 3	30 53·9	78 55·1	20,844	42.	Báspa *δ*...	31 16·3	78 22·3	19,334

19	Srikánta *h*	30	55·1	78	49·9	21,911	43.	Báspa *γ*	31	17·2	78	21·4	18,754
20.	Srikánta *j*	30	43·8	78	48·4	16,934	44.	Dandángsi *T*...	31	26·9	78	19·2	19,639
21.	Srikánta Central	30	56 1	78	48·1	20,105	45	Rári	31	19 8	78	18·3	19,044
22	Jáūli LXXV	30	51·3	78	50·5	21,672	46	Barbắtí South *Q*	31	20 0	78	18 2	18,863
23	Jhála East...	31	7·9	78	49·6	19,962	47	Barabắtí North *K*	31	21·0	78	18·2	18,648
24.	Jhála West	31	7·9	78	45·8	18,659	48.	Gorás *B*	31	19 9	78	10·8	16,509

III. *Kănáur.*

The peaks are all measured with the third degree of accuracy.

1.	Rúkor East I	31	38 5	78	40 2	19,946	14.	Málgan *A*...	31	38·1	78	8·0	19,494
2.	Rúkor West *W*	31	38·9	78	38·4	20,645	15.	Buránda West *F*... ...	31	23·9	78	6·9	16,890
3	Rothíngi *F*	31	31·9	78	38·2	19,205	16.	Dógri *μ*	31	27·1	78	5 6	16,342
4	Urcha *Q*	31	40·1	78	36·7	20,641	17	Pábar *A*	31	24·6	78	5·4	16,843
5.	Lámbar 5...	31	32·6	78	39·1	20,380	18	Shátul *M*...	31	24 6	78	1·7	17,269
6.	Mórang *P* or 3	31	34·9	78	13·6	20,513	12	Kársva 4	31	25·4	77	54 8	17,201
7.	Kiukúchi 1 or *K*	31	27·2	78	28·1	20,824	20.	Rúnepu 5	31	26 3	77	53·7	16,903
8.	Chárang North *l*	31	25·9	78	27 2	20,254	21.	Tári, or Bhabéh 2	31	42·8	77	44·0	18,626
9.	Chárang South *n*	31	25 4	78	26·3	19,800	22.	Tári, or Bhabéh 3	31	41·4	77	53·5	18,445
10.	Ráldang South *S*	31	29.6	78	21 6	21,250	23	Tári, or Bhabéh *β*	31	43·7	77	50 3	17,244
11	Ráldang North *R*... ..	31	31 2	78	20·9	19,866	24.	Tári, or Bhabéh *δ*	31	41·0	77	56·5	17,947
12.	Castle Rock *X*	31	27·5	78	17·4	18,048	25.	Tári, or Bhabéh *ϵ*	31	4 ·3	78	2·0	17,558
13.	Castle Rock *D*	31	27·9	78	17·3	18,012	26	Tári, or Bhabéh × ...	31	42·4	77	45·4	17,471

IV. *Kúlu.*

The peaks are all measured with the second degree of accuracy.

1.	Rátang *S* II	32	1·5	77	46 4	21,365	5.	Rátha *β*	32	20·6	77	1·6	19,462
2.	Părbātí I	31	51·5	77	42 0	20,515	6.	Goraldtnu X, ...	32	6·9	76	55.6	15,108
3.	Shăncha *c*	31	43·7	77	30·8	15,605	7	Tongáur *β′*	32	12·9	76	54.6	17,028
4.	Deotiba	32	12·9	77	23·0	20,417	8.	Thámsar	32	12·6	76	44·7	16,662

D. NORTH WESTERN HIMA′LAYA.

I. *Lahól.*

The peaks are all measured with the second degree of accuracy.

No. Curr.	Name of the Peak and sign of the G. T. Survey.	Geographical Co-ordinates. Lat. North ° ′	Long. East ° ′	Height Eng. Feet.	No. Curr.	Name of the Peak and sign of the G. T. Survey.	Geographical Co-ordinates. Lat. North ° ′	Long. East ° ′	Height Eng. Feet.
1.	Kúnzam, or Kúlzum μ ...	32 21·3	77 42·4	20,581	10.	Shigri L^x	32 42·7	77 15·6	18,424
2.	Súrcha East K^{IV} ...	32 32·7	77 40·4	19,981	11	Gáphan...	32 28·7	77 13·3	19,212
3.	Súrcha West K^{III}	32 35·5	77 37·4	20,073	12.	Kárdong *P*	32 33·1	77 8·8	18,942
4.	Shígri L^{III}	32 22·4	77 33·2	19,949	13.	Sissu *M*...	32 26·0	77 2·4	20,355
5.	Shígri L^{II}	32 21·1	77 32·5	20,566	14.	Ghúsa...	32 30·5	76 51·5	19,833
6.	Shígri L^{V}	32 22·4	77 28·7	19,839	15.	Northern Chándra Bhága...	33 2·5	76 44·2	18,180
7.	Shígri L	32 26·9	77 27·9	20,442	16.	Northern Chándra Bhága I.	33 4·4	76 34 0	18,645
8.	Shígri L^{VI}	32 32·8	77 23·9	21,415	17.	Northern Chándra Bhága λ'	33 5·7	76 34·0	20,151
9.	Shígri L^{VII}	32 38·4	77 22·7	20,561	18.	Northern Chándra Bhága λ	32 49·2	76 32·3	20,658

II. *Chámba.*

The peaks are all measured with the second degree of accuracy.

No. Curr.	Name of the Peak and sign of the G. T. Survey.	Geographical Co-ordinates. Lat. North ° ′	Long. East ° ′	Height Eng. Feet.	No. Curr.	Name of the Peak and sign of the G. T. Survey.	Geographical Co-ordinates. Lat. North ° ′	Long. East ° ′	Height Eng. Feet.
1.	Gáuri θ'	32 10·9	76 48·9	16,017	3.	Chéro West	32 33·7	76 36·2	19,208
2.	Chéro East P'	32 34·6	76 41·9	20,044	4.	Túral λ	32 15 0	76 28·2	16,315

III. *Kishtvár.*

The peaks are all measured with the second degree of accuracy.

1.	Chimrát	32	46·4	76	47·2	20,257	7.	Southern Chándra Bhága *West End*	32	40·4	76	25·7	18,639
2.	Gurdhár South	32	55·1	76	41·9	21,142	8.	Southern Chándra Bhága *Double Top*	32	40·9	76	31·2	19,668
3.	Gurdhár North X	32	57·6	76	37·2	17,919	9.	Southern Chándra Bhága *Black Cone*	32	49·2	76	21.6	17,145
4.	Southern Chándra Bhága *N*	32	55·2	76	20·2	17,243	10.	Paupdár	32	56·5	76	19·2	16,836
5.	Southern Chándra Bhága *D.*	32	58·4	76	19·5	17,426	11.	Véheli 2	33	19·3	76	17·0	19,906
6.	Southern Chándra Bhága *E.*	32	59·4	76	15·1	16,042	12	Kishtvár i	33	11·0	76	2·2	16,662

IV. *Rajáuri.*

The peaks are all measured with the second degree of accuracy.

1.	Bắrma Sákul	33	28·9	74	49·3	15,483	5.	Rátan Pir c²	33	31·6	74	41·4	15,127
2.	Rátan Pir b¹	33	28·6	74	50·0	15,140	6.	Rátan Pir d	33	32·7	74	38·8	15,114
3.	Rátan Pir b³	33	29·3	74	48·6	15,593	7.	Tátta Kútti South	33	44·9	74	27·1	15,524
5.	Rátan Pir c¹	33	31·5	74	41·4	15,095	8.	Tátta Kútti North y ...	33	54·4	74	24·9	15,133

V. *Kashmír.*

The peaks are all measured with the second degree of accuracy.

1.	Machahói *f*..	34	13·7	75	34·3	17,904	7.	Báltal, or Gvashbıári.. ...	34	9·9	75	18·8	17,839
2.	Purmandal Ke Sir 12 ...	34	3·6	75	30·4	17,052	8.	Haramúk	34	24·1	74	53·6	16,903
3.	Pir Panjál α	33	48·9	75	26·5	14,58	9.	Kaj Nag 1...	34	13·8	74	0·8	14,438
4.	Pir Panjál β^5	33	26·1	75	28·1	14,546	10.	Sathṓla	34	20·7	73	57·0	14,039
5.	Pir Panjál β^6	33	32·0	75	28·8	14,187	11	Málekpur 2	34	21·3	73	55·9	14,338
6.	Ambarnáth *e*...	34	13·6	75	28·7	17,321	12.	Ismắel de Dóri North ...	24	29·8	73	54·3	12,643

This Article having been communicated to Col. Walker, Superintendent of the Grand Trigonometrical Survey by the Honorary Secretary, elicited the following reply.

DEHRA DOON, 19*th November* 1865.

MY DEAR SIR,

I am obliged to you for forwarding for my perusal Robert de Schlagintweit's paper, enumerating the snow peaks hitherto measured in the Himalayas. Opinions will probably differ, as to the utility of the nomenclature therein adopted, or indeed of any attempt to give names to mountains, which the inhabitants of the surrounding regions have not yet attempted to name. To some few of the most prominent peaks, it may be convenient to give names ; but as the process of selecting a suitable appellative is necessarily arbitrary, there will be great differences of opinion, as to the propriety of the selection. Thus, the highest known mountain in the Himalayas was named Mount Everest by the late Surveyor General, Sir Andrew Waugh, in honor of his predecessor. It is the only mountain to which our officers have ventured to give a name, for, as a rule, we accept what we find, and give nothing that is either doubtful, imaginary, or fanciful. Yet, in the one instance in which we have departed from our rule, we have not been universally followed. No less an authority than Sir John Herschel, in the last edition of his Physical Geography, refers to our Mount Everest by the name of Deo Danṛa.

Herr Schlagintweit has mistaken the object of the Roman numerals which are employed in the paper I communicated to the Journal of the Asiatic Society. It is not intended that they shall never give place to other symbols. When the regions in which the corresponding peaks stand shall have been topographically surveyed, the total number of peaks laid down will be tenfold greater than it is at present, and this must necessitate a fresh arrangement of symbols, the present being merely an enumeration of the peaks already known, in order of sequence, from East to West: I find that a similar arrangement has been adopted by the Russian surveyors in their published synopsis of the co-ordinates of the stations of the Russian survey: even where the places are well known, it is found convenient to refer to them by numerals, arranged in order from North to South, as well as by their names; but, of course, when additional positions are determined, the existing numerical arrangement must be altered. We have adopted Roman numerals with no other object than to prevent confusion with the Italian numerals that are employed in giving the elements of latitude, longitude and height, which are usually written on our charts by the side of the symbolic name.

Certain erroneous inferences might be drawn from Herr Schlagintweit's paper, which I am sure no one will be more obliged to me than that gentleman himself for here pointing out

First. That the snowy peaks enumerated by himself are all that have been hitherto measured in the Himalayas. They comprise all of which the positions have hitherto been *published,* as far as I know to the contrary; but they do not comprise a fifth part of the number already measured by the officers of this survey.

Secondly. That none of the peaks to which he assigns the 3rd degree of accuracy have been measured by the G. T. Survey. Of these, there is an important group in the district of Kănáur. Herr Schlagintweit's figures are all but identical with the values given in the published "Chart of the first section of the North West series; 1847-1854." It is evident that they were derived from that source only, and that the few differences which exist are merely due to errors in copying the original. Besides which, the source from which these data have been obtained is duly acknowledged in Vol. II of the de Schlagintweit's "India and High Asia," to be the G. T. Survey.

Third. That the height of 26,522 *which is assigned to peak XXXIX in the Journal of the Asiatic Society, is a mis-print for* 2,052. On referring to the original records, I find that there has not been any mis-print. The height of this peak has been determined with as great accuracy as any other peak fixed by the G. T. Survey; it has been observed from no less than eight independent stations, and the individual results are singularly accordant, falling within an extreme range of 38 feet.

Fourth. That the valuable memoir in the Journal of the Asiatic Socicty was written by myself. It was written by my able Assistant Mr. Hennessy, and was merely communicated by myself to the Society.

I may add that recent operations of the G. T. Survey, in Assam confirm the accuracy of the latitudes and longitudes assigned by Herr Schlagintweit to his three first peaks in Bhutan, but they increase the heights as follows. Dal-La East by 987 feet, Dal-La West by 571 feet, and Theme-Ri by 798 feet.

Believe me, dear Sir,
Your's very truly,
J. T. Walker, *Lt. Col. R. E.*,
Supt. G. T. Survey of India.

On the question of the propriety of the name "Deo Danga" for Mount Everest, I am informed by Colonel Ramsay, the Resident in Nepaul, that "Danga, or as the word is usually pronounced, Danra, is the usual Nepalese term for a mountain ridge, in contradistinction to the word "Lek" (pronounced Lake) which is used to designate a mountain top or peak."

J. T. W.

DAILY

AND

HALF MONTHLY RESULTS

OF

METEOROLOGICAL OBSERVATIONS

MADE AT THE

MADRAS OBSERVATORY.

IN THE YEAR 1863.

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

January. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
1	30·023	69·7	66·7	77·4	63·0	95·7	57·4	65·1	86	71	NE	—	3	Fine.
2	30·013	71·8	67·1	78·3	63·9	98·3	61·5	64·5	79	111	NE	—	16	Light flying clouds.
3	30·015	73·6	67·0	79·3	70·8	98·3	67·0	63·4	72	162	NE by N	—	20	Passing clouds.
4	30·029	74·3	71·1	80·3	67·5	101·6	66·2	69·6	86	155	NNE	—	47	Frequently overcast.
5	29·983	74·9	71·7	80·5	71·5	97·5	69·6	70·2	86	179	NE	—	43	Frequently overcast. Shower [at 3 P. M.]
6	29·999	74·2	68·5	79·2	69·7	95·3	66·7	65·6	75	150	ENE	—	34	Passing clouds.
7	30·012	73·7	67·8	79·4	65·9	97·0	62·1	64·6	74	139	NE by N	—	12	Chiefly fine.
8	30·017	74·2	69·4	79·4	67·8	97·3	64·6	67·0	79	190	NNE	—	36	Flying clouds,
9	30·021	75·4	69·0	79·7	72·4	97·6	70·0	65·8	73	237	NNE	—	38	Flying clouds.
10	30·061	74·4	69·3	79·7	69·6	97·8	67·9	66·7	78	183	NNE	—	31	Flying clouds.
11	30·074	73·9	67·7	79·5	68·4	95·7	64·4	64·4	73	174	NNE	—	22	Chiefly fine.
12	30·057	73·3	67·3	78·7	65·9	97·1	62·2	64·1	74	137	NE by N	—	15	Light passing clouds.
13	30·015	70·8	65·8	77·9	64·7	96·8	62·6	63·0	77	113	NNE	—	15	Light passing clouds.
14	30·010	72·5	66·9	77·7	63·6	97·3	59·4	63·8	76	100	NE	—	20	Passing clouds.
15	30·039	72·1	66·6	79·3	66·8	98·5	63·4	63·5	76	95	NE	—	20	Nearly clear.
Mean......	30·024	73·2	68·1	79·1	67·4	97·5	64·3	65·4	78	146	NE by N	0·00	25	
Average..	30·004	74·6	68·9	80·0	69·1	96·8	63·5	66·0	76	155	NE	0·64	42	
Difference..	+0·020	—1·4	—0·8	—0·9	—1·7	+0·7	+0·8	—0·6	+2	—9	1 Point N	—0·64	—17	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

January. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity	Direction.			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents.	
16	30·031	73·2	67·7	78·9	65·3	98·1	61·2	64·7	76	118	N E	—	11	Fine.
17	30·036	74·0	68·5	79·8	67·6	99·0	64·1	65·7	76	118	N E	—	15	Nearly fine.
18	30·054	72·5	67·8	80·0	65·9	99·1	61·6	65·3	79	86	NE by E	—	12	Fine.
19	30·066	72·7	68·5	79·8	66·7	99·3	63·0	66·3	81	91	NE by E	—	10	Fine.
20	30·026	71·8	67·9	79·2	66·0	99·3	—	65·9	82	88	E by N	—	11	Fine.
21	30·022	73·1	68·7	80·2	65·2	99·3	61·1	66·5	80	78	E	—	11	Nearly fine.
22	30·061	74·7	68·9	79·7	66·8	97·4	62·5	65·9	75	113	E N E	—	8	Light passing clouds.
23	30·011	75·1	69·5	79·8	68·8	97·3	65·0	66·7	76	169	NE by E	—	26	Passing clouds.
24	29·939	74·8	69·5	79·4	67·6	97·6	63·9	66·8	77	162	N E	—	5	Fine.
25	29·987	76·0	70·1	80·2	68·8	99·7	64·1	67·2	75	167	N E	—	39	Frequently clouded.
26	29·997	75·8	72·1	80·5	72·1	96·4	70·5	70·4	84	222	N N E	—	91	Overcast.
27	29·998	73·1	71·2	75·6	72·5	—	72·3	70·3	91	197	N N E	1·46	100	Overcast. Frequent rain after [7 A. M.
28	29·973	74·0	71·0	78·4	70·6	91·8	70·5	69·6	87	208	N E	0·49	100	Overcast. Rain from 1 to 5 P.M.
29	29·969	75·7	71·1	79·4	72·5	97·2	71·3	68·9	81	164	NE by N	—	95	Nearly overcast.
30	29·970	75·5	71·0	79·7	69·7	99·1	67·2	68·9	81	173	NE by N	—	54	Flying clouds.
31	29·988	75·9	71·9	80·8	70·9	102·1	68·7	70·0	83	149	N E	—	57	Frequently overcast.
Mean.....	30·008	74·2	69·7	79·5	68·6	98·2	65·8	67·4	81	144	N E	1·95	40	
Average..	29·991	74·5	68·6	80·6	68·2	97·8	60·6	65·5	75	128	NE by E	0·37	31	
Difference..	+0·017	—0·3	+1·1	—1·1	+0·4	+0·4	+5·2	+1·9	+6	+16	1 Point N	+1·58	+9	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

February. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.	Velocity	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents.	
1	29·997	76·3	72·8	81·3	73·4	99·2	70·5	71·2	85	182	N E	—	80	Chiefly overcast.
2	29·995	76·1	71·2	80·5	72·6	98·8	70·5	68·8	79	148	N E	—	40	Flying clouds.
3	29·950	74·2	70·1	79·4	69·0	97·9	66·2	68·1	83	109	N E	—	21	Chiefly fine.
4	29·920	73·5	70·4	80·4	67·7	99·9	62·7	68·9	87	65	E N E	—	12	Fine. Heavy dew.
5	29·914	73·9	71·1	81·0	66·7	101·1	62·3	69·8	88	64	E N E	—	18	Light hazy clouds.
6	29·938	72·9	69·7	81·6	66·8	101·2	62·6	68·2	85	84	E N E	—	2	Fine but misty.
7	29·966	74·3	71·1	80·3	67·4	100·6	63·6	69·6	86	98	N E by E	—	35	Frequent clouds.
8	29·924	74·3	71·3	82·2	68·6	102·7	65·4	69·9	87	96	N E	—	47	Hazy and cloudy.
9	29·894	75·7	72·4	82·3	68·5	102·8	63·6	70·9	86	92	N E	—	34	Hazy and cloudy.
10	29·883	76·0	72·4	82·3	69·5	101·8	64·6	70·8	85	67	E by S	—	49	Light clouds.
11	29·906	77·0	72·9	81·7	69·4	99.6	63·2	71·1	83	110	S E	—	19	Hazy.
12	29·932	78·6	74·8	83·4	72·4	101·8	67·6	73·2	84	99	E by S	—	44	Flying clouds.
13	29·925	78·4	73·5	82·8	74·4	101·0	69·4	71·4	79	139	E	—	36	Flying clouds.
14	29·899	76·6	73·4	83·4	72·3	98·0	65·9	72·0	86	122	S E	—	11	Fine.
Mean......	29·932	75·6	71·9	81·6	69·9	100·5	65·6	70·2	85	105	E by N	0·00	32	
Average..	29·982	75·6	69·8	81·8	69·0	99·9	64·9	66·9	75	135	E	0·27	28	
Difference	—0·050	0·0	+2·1	—0·2	+0·9	+0·6	+0·7	+3·3	+10	—30	1 Point N	—0·27	+4	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

February. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humi. dity.	Velocity	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
15	29·904	77·7	73·6	83·2	71·4	97·7	67·1	71·8	83	133	S E by S	—	10	Fine.
16	29·873	76·8	72·9	85·0	71·7	100·0	68·0	71·1	83	120	E by E	—	37	Flying clouds.
17	29·889	76·9	72·5	83·7	70·4	101·2	66·3	70·5	81	100	S S E	—	20	Hazy day. Fine night.
18	29·917	77·6	72·1	83·2	70·3	103·1	65·4	69·6	77	89	E S E	—	21	Chiefly fine.
19	29·954	77·4	71·1	81·7	69·9	101·2	64·6	68·1	74	161	N E	—	43	Frequently clouded.
20	29·982	79·8	73·2	83·4	76·5	101·8	70·9	70·2	74	219	NE by N	—	87	Overcast.
21	29·962	79·4	74·3	84·0	76·3	103·8	73·2	72·1	79	191	N E	—	89	Chiefly overcast.
22	29·975	78·2	71·8	82·2	74·5	100·1	70·0	68·8	74	170	NE by N	—	48	Light hazy clouds.
23	29·996	77·7	72·9	82·5	72·5	102·4	68·2	70·7	80	148	N E	—	60	Passing clouds.
24	30·024	74·9	68·7	80·5	66·7	99·9	59·9	65·5	73	131	N E	—	12	Fine.
25	29·994	73·5	66·9	80·2	65·3	99·6	58·3	63·2	72	124	N E	—	6	Do.
26	29·993	72·7	67·4	80·4	65·0	100·7	58·0	64·5	77	80	E N E	—	11	Hazy.
27	29·960	73·4	69·4	80·7	65·3	100·8	58·2	67·4	82	83	E N E	—	5	Fine.
28	29·941	74·7	70·6	81·2	65·1	101·7	57·3	68·7	83	92	E N E	—	10	Hazy.
Mean..	29·955	76·5	71·2	82·3	70·1	101·0	64·7	68·7	78	132	E by N	0·00	33	
Average..	29·958	76·9	70·8	83·8	69·7	100·1	64·5	67·9	75	130	E S E	0·05	23	
Difference..	—0·003	—0·4	+0·4	—1·5	+0·4	+0·9	+0·2	+0·8	+3	+2	3PointsN	—0·05	+10	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

March. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
1	29·919	75·0	71·1	84·9	68·2	108·5	61·2	69·2	83	82	S E	—	32	Cloudy morning : fine day.
2	29·865	76·2	71·7	84·8	68·3	103·6	61·8	69·6	81	103	S E	—	0	Fine.
3	29·8[illegible]2	78·3	74·0	86.1	68·4	101·7	61·4	72·2	82	127	S S E	—	11	Light haze.
4	29·833	79·7	74·5	86·0	71·7	102·7	66·1	72·7	80	138	S S E	—	15	Fine day : hazy night.
5	29·893	79·0	71·9	84·9	71·3	102·6	65·0	68·4	70	111	S E	—	11	Fine.
6	29·901	77·7	70.6	84·4	69·3	103·7	64·0	67·2	71	88	E by S	—	8	Fine.
7	20·875	78·3	70·2	85·5	68·7	104·5	62·7	66·3	68	91	E by S	—	0	Fine.
8	29·922	77·4	69·9	83·2	69·4	102·5	63·6	66·1	69	98	E	—	15	Fine day : flying clouds at night.
9	29·951	78·7	72·5	84·8	71·1	193·7	67·3	69·7	74	107	E	—	15	Light clouds.
10	29·918	80·2	74·8	86·2	72·3	105·4	68·2	72·5	78	102	E	—	25	Flying clouds.
11	29·868	80·3	75·7	86·3	74·2	106·0	70·5	73·8	81	101	E S E	—	37	Occasional clouds.
12	29·837	81·9	76·0	88·5	75·5	105·5	71·8	73·6	76	110	S S E	—	33	Fine with passing clouds.
13	29·812	82·7	76·0	87·8	75·9	102·7	72·2	73·2	74	130	S E by S	—	9	Fine.
14	29·[illegible]33	82·2	76·7	88·8	75·6	104·2	72·3	74·5	78	137	S S E	—	12	Light hazy clouds.
15	29·899	82·4	76·2	88·1	76·1	105·4	71·9	73·7	76	91	S E	—	30	Frequently clouded.
Mean...	29·876	79·3	73·5	86·0	71·7	1 4·2	66·7	70·9	76	108	S E by E	0·00	17	
Average.	29·920	78·9	72·7	85·5	71·7	1 020	66·4	69·9	75	138	S E	0·05	23	
Difference	—0·044	+0·4	+0·8	+0·5	0	+2·2	+0·3	+1·0	+1	—30	1 Point E	—0·05	—6	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

March. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents.	
16	29·948	78·9	75·4	84·8	75·3	102·3	73·2	73·9	85	52	E S E	0·65	57	Chiefly overcast. Rain at 4½ and 8 to 9 A. M.
17	29·870	81·5	75·3	86·3	75·5	105·3	71·6	72·7	75	75	S E	—	20	Light clouds.
18	29·878	81·3	74·8	87·1	75·3	103·7	71·9	72·0	74	83	S E	—	10	Fine.
19	29·939	81·3	74·8	86·1	75·3	104·4	71·2	72·0	74	71	S E	—	41	Flying clouds.
20	29·939	81·2	76·1	87·3	74·7	107·5	71·6	74·0	80	79	S S E	0·02	33	Frequently clouded.
21	29·945	81·1	75·4	85·5	76·7	106·8	72·7	73·0	77	65	S E	—	76	Chiefly overcast.
22	29·935	80·3	73·9	86·2	76·5	109·8	74·0	71·1	74	127	N E by E	—	87	Chiefly overcast.
23	29·928	81·5	75·4	87·3	75·3	106·6	72·1	72·9	76	54	E	—	31	Fine with light haze.
24	29·945	81·0	75·2	87·5	74·6	106·4	70·5	72·8	77	59	S E	—	11	Fine.
25	29·924	81·4	75·4	88·2	73·6	104·4	69·0	72·9	76	68	S E by S	—	9	Light haze.
26	29·912	80·6	73·9	87·9	72·7	106·7	68·3	70·9	73	66	S S E	—	3	Fine.
27	29·873	80·0	74·7	87·6	72·8	105·5	66·8	72·5	79	58	S E	—	4	Fine.
28	29·865	81·2	74·5	88·4	72·5	106·5	67·0	71·6	74	88	S S E	—	6	Light clouds at night.
29	29·875	82·3	76·8	89·1	73·9	104·8	68·5	74·6	78	116	S S E	—	7	Fine.
30	29·868	82·3	75·6	88·4	74·5	103·2	70·4	72·8	74	116	S by E	—	9	Light haze.
31	29·868	81·4	75·8	88·5	74·2	104·3	68·2	73.5	78	115	S	—	19	Flying clouds.
Mean......	29·907	81·1	75·2	87·3	74·6	105·5	70·4	72·7	77	81	S E	0·67	26	
Average..	29·886	80·9	74·9	87·5	74·2	102·8	69·0	72·4	76	144	S S E	0·32	28	
Difference	+0·021	+0·2	+0·3	−0·2	+0·4	+2·7	+1·4	+0·3	+1	−63	2 Points E	+0·35	−2	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

April. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.	Velocity.	Direction.			
	Inches.	°	°	°	°	°	°	°	Cents.	Miles.	Points.	Inches.	Cents.	
1	29·860	82·5	75·9	89·2	74·1	107·5	69·8	73·2	74	121	S	—	12	Light haze.
2	29·813	83·4	76·9	92·4	75·7	107·4	71·6	74·3	75	165	S	—	9	Fine day : hazy night.
3	29·746	83·8	77·5	91·7	75.7	104·6	71·6	75·0	76	189	S	—	15	Hazy.
4	29·710	84·7	78·3	91·3	77·9	104·6	71·8	75·9	76	205	S S W	—	24	Cloudy for several hours.
5	29·751	84·6	78·4	91·9	78·7	104·3	74·3	76·1	76	205	S	—	25	Light haze.
6	29·752	85·9	78·4	93·4	78·9	104·5	75·0	75·5	72	217	S by W	—	25	Fine : cloudy about sunset.
7	29·737	85·7	79·6	96·9	79·1	112·7	75·9	77·4	77	208	S S W	—	20	Hazy.
8	29·757	86·1	79·8	94·6	79·6	107·3	76·5	77·5	76	221	S	—	4	Fine.
9	29·833	85·1	79·1	92·1	79·7	102·5	77·4	76·9	77	189	S	—	14	Fine.
10	29·862	84·7	78·0	91·7	78·1	104·6	74·1	75·4	75	131	S S E	—	10	Fine.
11	29·829	84·1	77·8	90·9	75·7	103·8	71·9	75·4	76	124	S S E	—	5	Fine.
12	29·794	84·9	77·7	91·0	76·3	105·2	72·2	74.9	74	145	S E by S	—	13	Fine with passing clouds.
13	29·768	85·5	78·2	92·4	77·5	105·6	74·1	75·4	73	160	S E	—	11	Fine.
14	29·789	85·9	79·1	92·6	78·3	105·4	74·3	76·5	75	148	S E by S	—	10	Fine with flying clouds.
15	29·816	85·5	78·8	92·3	78·7	108·6	75·0	76·3	75	63	E S E	—	17	Passing clouds.
Mean ..	29·788	84·8	78·2	92·3	77·6	105·9	73·7	75·7	75	166	S by E	0·00	14	
Average..	29.843	83·1	77·0	90·0	77·4	105·9	71·8	74·6	76	173	S by E	0·16	26	
Difference	—0·055	+1·7	+·21	+2·3	+0·2	0·0	+1·9	+1·1	—1	—7	Same as	—0·16	—12	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

April. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min,	Max.	Min.	Dew Point·	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents.	
16	29·810	84·7	78·1	91·5	80·5	109·6	77·0	75·6	75	100	E S E	—	30	Frequently clouded. Lightning at
17	29·805	85.5	78 1	91·3	79·1	107·5	76·7	75·3	72	83	S E	—	17	Occasionally cloudy. [night.
18	29·788	85·7	78·9	92.5	77·7	110·6	74·5	76·3	75	53	E S E	—	34	Heavy passing clouds.
19	29·774	85·8	78·7	91·3	80 3	107·9	76·6	76·0	74	79	S by E	—	49	Heavy clouds. A few rain drops.
20	29·792	8·33	77·4	90·1	78·7	106·6	77·0	75·1	77	71	S by E	0·20	80	Cloudy. Rain at 6¾ A. M.
21	29·814	77·3	75·5	82·5	75·5	83·2	74·1	74·7	92	68	E S E	1 71	100	Steady rain after 6 A. M.
22	29·830	78·1	76·4	83·1	74·7	—	73·2	75·7	92	82	S S E	0·60	100	Overcast and rainy.
23	29·840	80·7	77·5	86·9	75·3	102·4	73·9	76·3	87	90	S S E	0·41	68	Overcast and showery.
24	29·823	78·2	75·9	87·0	74·9	101·8	73·6	74·9	89	119	S S E	2·10	68	Chiefly overcast. A thunder storm from West between 7 & 8 P. M.
25	29 779	79·7	76·8	90·6	73·7	108·3	72·2	75·7	88	98	S S W	0·03	53	Cloudy with light showers.
26	29·780	84·4	77·8	91·1	76·3	111·8	74·8	75·2	75	104	S S E	—	24	Light clouds.
27	29·764	8·56	80·7	94·0	79·0	113·2	76·3	79·0	81	108	S by E	—	15	Chiefly fine.
28	29·777	84.8	79·2	96·8	79 6	111·3	77·4	77·1	78	123	S	—	26	Fine with passing clouds.
29	29·753	86·6	80·4	96·8	77·9	112·1	76·6	78·2	76	141	S by W	—	20	Flying clouds before day break.
30	29·745	87·8	80·3	98·9	80·9	116·3	78·6	77·6	72	164	S by W	—	34	Flying clouds before day break.
Mean	29·792	83·2	78·1	91·0	77·6	107·3	75·5	76·2	80	99	S E by S	5·05	48	
Average .	29 806	84·0	77·6	91·0	78·4	107·8	75	75·1	75	174	S by E	05	34	
Difference	—0·014	— 0·8	+ 0·5	0·0	— 0·8	— 0·5	— 0·3	+ 1·1	+5	—75	2Points E	+4·40	+14	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

May. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents.	Miles.	Points.	Inches.	Cents.	
1	29·748	88·5	80·3	98·5	81·6	125·3	78·1	77·3	70	151	S by W	—	12	Light haze.
2	29·759	87·0	81·4	98·1	81·3	115·3	78·2	79·5	79	173	S	—	0	Fine.
3	29·742	86·9	80·3	96·7	80·7	115·3	77·0	77·9	75	160	S	—	0	Fine.
4	29·752	86·8	79·4	95·4	79·5	105·3	75·3	76·6	73	231	S	—	0	Fine.
5	29·735	87·3	79·9	93·6	79·5	105·3	76·6	77·2	73	219	S by E	—	5	Fine.
6	29·730	86·5	80·2	94·5	79·7	105·7	76·1	78·0	76	245	S by E	—	0	Fine.
7	29·758	86·6	80·4	94·5	80·3	107·1	77·7	78·2	76	228	S by E	—	3	Fine.
8	29·698	88·2	80·4	96·2	81·3	115·3	78·8	77·6	72	211	S	—	14	Hazy.
9	29·698	88·2	79·0	98·2	80·5	109·6	75·9	75·5	67	183	S	—	15	Fine day : cloudy night.
10	29·703	88·2	80·2	94·7	81·9	110·3	78·4	77·3	71	194	S by E	—	17	Fine day : cloudy night.
11	29·696	87·3	80·4	92·7	81·4	109·2	78·6	77·9	74	174	SS E	—	38	Cloudy and hazy.
12	29·690	87·4	82·1	92·3	82·2	105·2	79·3	80·3	80	124	S E	—	39	Cloudy and hazy.
13	29·694	86·2	79·3	94·4	80·7	112·2	77·8	76·7	74	79	E S E	—	76	Chiefly overcast.
14	29·705	86·3	79·3	92·2	79·7	108·2	76·4	76·7	74	74	E by S	—	97	Overcast.
15	29·710	85·3	79·9	92·9	81·6	112·2	78·5	78·0	79	81	E N E	—	71	Passing clouds. Rain drops after sunset.
Mean....	29·721	87·1	80·2	95·0	80·8	110·8	77·5	77·7	74	168	S S E	0·00	26	
Average..	29·756	85·3	78·1	93·0	79·8	109·8	77·4	75·4	73	201	S	1·32	39	
Difference	—0·035	+ 1·8	+ 2·1	+ 2·0	+ 1·0	+ 1·0	+ 0·1	+ 2·3	+ 1	—33	2Points E	— 1·32	—13	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

May. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
		Dry.	Wet.	Shade.		Sun.	Grass	Dew Point.	Humidity.	Velocity.	Direction			
				Max.	Min.	Max.	Min.							
	Inches.	°	°	°	°	°	°	°	Cents.	Miles.	Points.	Inches.	Cents	
16	29·712	86·1	80·1	92·2	81·3	111·1	78·9	78·0	77	76	S E by E	0·12	51	Rain before sunrise Partly [fine.
17	29·679	87·5	79·4	93·4	80·3	107·4	76·8	76·4	71	141	S E	—	26	Light hazy clouds.
18	29·652	87·8	81·0	94·4	81·0	106·1	77·9	78·6	75	178	S S E	—	41	Hazy and cloudy.
19	29·681	87·3	78·8	95·5	81·5	112·8	78·6	75·6	69	169	S	—	37	Frequently cloudy.
20	29·690	87·3	78·0	98·4	80·9	113·4	77·6	74·4	66	192	S S W	—	43	Hazy clouds.
21	29·709	88·4	78·2	99·5	81·7	115·2	78·6	74·2	64	267	S S W	—	27	Light hazy clouds.
22	29·739	86·7	78·1	95·2	80·0	113·3	76·8	74·7	68	191	S	—	66	Cloudy.
23	29·738	87·5	76·9	99·3	80·5	115·1	77·5	72·6	62	173	S W	—	48	Passing clouds.
24	29·752	88·1	77·0	97·1	81·2	116·0	77·7	72·5	61	155	S W	—	32	Light clouds.
25	29·775	88·4	78·7	96·0	79·9	114·3	75·7	75·0	66	153	S	—	20	Light clouds.
26	29·773	86·3	76·6	98·7	80·4	115·4	75·6	72·6	65	144	S S W	—	34	Passing clouds.
27	29·736	88·4	77·3	101·4	79·7	116·1	76·1	72·8	61	168	S W by S	—	31	Passing clouds.
28	29·707	89·5	78·1	100·6	80·6	116·6	77·7	73·6	61	173	S by W	—	23	Chiefly fine.
29	29·691	89·5	79·1	100·9	81·6	112·9	79·3	75·2	64	189	S	—	35	Fine with occasional clouds.
30	29·664	91·4	77·1	99·8	82·4	117·9	80·3	71·2	53	118	S	—	47	Hazy clouds.
31	29·631	89·5	77·2	101·4	84·7	118·1	81·2	72·1	58	131	S W	—	70	Chiefly overcast.
Mean.....	29·708	88·1	78·2	97·7	81·1	113·9	77·9	74·3	65	169	S	0.12	39	
Average..	29·707	86·2	77·5	95·1	80·4	110·6	78·2	74·1	68	218	S W	1·60	47	
Difference	+ 0·001	+ 1·9	+ 0·7	+ 2·6	+ 0·7	+ 3·3	— 0·3	+ 0·2	—3	—49	2Points S	— 1·48	—8	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

June. First Half.	Mean Pressure reduced to 32°.	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds.	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
1	29·631	89·1	78·8	102·0	81·4	116·0	78·1	74·9	64	171	S W	—	32	Light clouds.
2	29·654	88·7	78·5	95·5	81·2	111·9	76·7	74·5	64	190	S by W	—	15	Light clouds.
3	29·630	88·2	78·8	98·0	80·3	110·9	76·7	75·2	67	206	S	—	18	Hazy.
4	29·662	91·1	77·6	101·3	82·4	112·1	77·4	72·1	55	176	S W by S	—	25	Passing clouds.
5	29·695	90·0	77·3	103·0	82·2	112·9	77·7	72·1	57	221	S S W	—	52	Fine morning ; cloudy afternoon.
6	29·711	88·1	77·2	98·2	84·4	105·3	80·3	72·8	61	181	S S W	—	80	Chiefly overcast.
7	29·723	87·9	76·0	96·4	81·8	103·1	78·6	70·9	58	199	S W by S	—	94	Overcast.
8	29·742	84·6	76·5	95·3	78·8	106·1	74·5	73·2	70	137	S S W	0·12	93	Overcast. Rain before 2½ A.M.
9	29·759	85·9	77·5	96·4	79·4	107·9	76·1	74·2	69	139	S S W	—	62	Dull day ; clear night.
10	29·756	87·7	78·2	98·2	80·2	113·1	75·9	74·5	66	156	S by W	—	15	A few passing clouds.
11	29·728	88·1	78·3	100·9	79·5	102·2	75·9	74·5	65	154	S S W	—	43	Cloudy.
12	29·718	85·1	78·6	94·3	77·9	103·0	75·0	76·1	75	146	W S W	0·15	95	Chiefly overcast, Rain from 2¼ to 6 A.M.
13	29·734	86·2	76·0	97·4	80·6	110·7	77·7	71·7	63	136	S S W	0·12	85	Chiefly overcast. Rain at 4¼ & 7¼ P.M.
14	29·710	87·1	76·1	97·2	79·4	113·9	75·0	71·5	61	160	W S W	0·07	72	Heavy clouds. Shower about 5 P.M.
15	29·677	84·6	75·5	92·4	78·6	99·0	76·3	71·6	67	152	S W	—	100	Overcast.
Mean.. …	29·702	87·5	77·4	97·8	80·5	108·5	76·8	73·3	64	168	S S W	0·46	59	
Average..	29·692	86·6	76·7	95·8	80·7	109·8	78·2	72·7	64	230	S W	0·92	60	
Difference	+ 0·010	+ 0·9	+ 0·7	+ 2·0	— 0·2	— 1·3	— 1·4	—0·6	0	62	2 Points S	— 0·46	—1	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

June. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds.	Weather.
		Dry.	Wet.	Shade. Max	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents.	
16	29·729	80·3	73·9	85·9	77·4	89·0	74·1	71·1	74	114	W S W	0·12	100	Rain at 8 A. M. Overcast.
17	29·694	85·3	75·6	95·0	76·6	104·0	73·8	71·5	65	162	S W	—	97	Chiefly overcast.
18	29·680	88·6	74·3	96·1	79·4	105·9	76·3	67·8	52	189	S W	—	88	Frequently overcast.
19	29·678	89·9	73·6	96·1	82·2	103·5	78·6	65·9	46	230	W S W	—	90	Chiefly overcast.
20	29·667	88·9	74·2	94·1	83·2	99·7	77·9	67·4	51	237	SW by W	—	95	Overcast.
21	29·652	90·0	73·6	97·2	81·2	105·0	77·0	65·8	46	209	S W by S	—	82	Chiefly overcast.
22	29·678	89·1	75·6	99·4	82·2	111·0	75·4	69·7	54	215	S W	—	80	Cloudy. Lightning.
23	29·714	87·8	75·9	100·2	81·9	112·0	77·5	70·8	58	184	S W	—	65	Cloudy.
24	29·736	85·1	76·4	98·2	78·8	109·8	79·4	72·8	68	215	S W	0·30	73	Chiefly overcast. Thdr. storm at 8¾ P.M.
25	29·699	87·1	75·7	100·0	77·6	109·7	75·2	70·8	60	181	S S W	0·18	70	Chiefly overcast. Thdr. storm at 8 P.M.
26	29·679	88·2	73·8	94·7	79·4	105·1	76·8	67·1	51	212	W S W	—	74	Cloudy. Lunar halo.
27	29·646	88·1	74·1	97·3	81·5	107·9	78·6	67·7	52	206	SW by W	—	87	Overcast. Light showers.
28	29·656	86·4	76·9	98·2	81·2	107·9	77·0	73·0	65	193	S S W	—	78	Chiefly cloudy. Showery.
29	29·680	86·3	76·9	99·5	80·4	111·9	76·8	73·1	66	196	S S W	0·01	60	Frequently clouded.
30	29·692	87·5	76·9	100·1	81·7	114·6	78·4	72·5	62	206	S W by S	—	55	Flying clouds.
Mean	29·685	87·2	75·2	96·8	80·3	106·5	76·8	69·8	58	197	S W	0·61	80	
Average..	29·704	85·0	76·1	93·7	79·4	109·5	77·9	72·4	67	235	S W	1·29	70	
Difference	— 0·019	+ 2·2	— 0.9	+ 3·1	+ 0·9	— 3·0	— 1·1	— 2·6	—9	— 38	Same as	—0·68	+10	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

July. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced		Wind.		Rain.	Clouds.	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
1	29·696	85·8	76·3	100·1	81·8	111·0	78·6	72·3	65	217	S WbyW	0·10	60	Hazy clouds. Rain at 8½ P.M.
2	29·670	87·9	76·3	100.1	79·4	112·0	75·6	71·4	59	193	S W	0·07	67	Cloudy. Rain between 4 and 6 P. M.
3	29·666	90·9	75·3	99·1	80·9	110·0	76·6	68·3	49	180	S WbyW	—	61	Cloudy.
4	29·695	84·8	76·8	99·3	82·4	108·1	78·6	73·6	70	201	S W	0·34	65	Cloudy. Rain at 4 and 6½ P.M.
5	29·719	85·2	75·5	98·8	80·4	109·9	77·6	71·3	65	177	S S W	0·03	70	Passing showers after 4 P.M.
6	29·687	84·3	75·5	97·9	79·6	111·9	75·6	71·8	68	142	S S W	0·14	84	Rain after 10 P. M.
7	29·659	81·5	75·5	90·5	76·9	102·1	75 3	73·0	76	136	S W	0·34	100	Overcast. Rain at 2½ A. M. and 9 P.M.
8	29·636	80·9	76·4	91·9	75·7	102·9	73·6	74·6	82	101	S WbyW	0·04	90	Overcast. Shower at 4 P. M.
9	29·671	79·8	76 3	93·1	76·5	104·9	75 6	74·9	85	137	S S W	2·25	80	Overcast. Steady rain after 4 P. M.
10	29·719	82·3	76·9	91·1	75·6	104·9	74·8	74·7	79	150	S	0·11	88	Chiefly overcast. Shower at 9½ P. M.
11	29·732	83·5	77·9	91·3	76·6	107·9	73·7	75·7	78	131	S S W	0·36	47	Thunder storm at 11¼ P.M.
12	29·757	82·5	76·4	91·9	75·3	112·5	74·2	73·9	77	120	S WbyW	0·13	53	Chiefly fine. Shower at 11½ P M.
13	29·768	84·7	77·0	92·2	78·5	111·8	74.6	73·9	71	125	S	—	47	Flying clouds : fine night.
14	29·791	82·8	78·3	92·4	78·4	109·9	73·6	76·6	82	105	S	—	65	Flying clouds.
15	29·784	78·9	75·5	82·3	73·2	—	70·5	74·1	85	132	W S W	2·39	100	Thunder storm about 2 A. M. & rain until sunrise. Overcast.
Mean...	29·710	83·7	76·4	94·1	78·1	108·6	75·2	73·4	72	150	S W	6·30	71	
Average..	29·708	84·3	76·0	92·6	78·8	107·0	76·8	72·6	69	215	S W	1·93	74	
Difference	+ 0·002	— 0·6	+ 0·4	+ 1·5	— 0·7	+ 1·6	— 1·6	+0·8	+3	—65	1 Point S	+ 4·37	—3	

July 9th,—A sharp thunder storm from the North West about 6¾ P. M.

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

July. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.	Velocity,	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
16	29·772	84·0	76·8	91·0	77·1	105·8	74·6	73·9	72	136	S S W	—	55	Dull and hazy.
17	29·760	84·1	75·1	93·1	77·1	100·9	74·0	71·2	66	144	S W by W	—	75	Dull and hazy.
18	29·713	85·3	75·4	94·5	77·1	102·8	70·7	71·1	64	162	W S W	—	54	Hazy.
19	29·655	85·4	76·8	95·3	77·2	109·9	73·7	73.3	68	155	S W	—	52	Passing clouds. Fine night.
20	29·669	85·3	76·4	92·9	77·5	107·7	70·1	72·8	67	159	SW S	—	19	Chiefly fine.
21	29·655	86·9	77·0	95·0	81·4	112·0	77·1	73·0	64	163	S W	—	41	Passing clouds. Wind very variable
22	29·661	83·5	76·6	89·7	77·6	97·9	74·8	73·8	73	138	W	0·13	94	Frequent showers before 9 A. M.
23	29·665	78·5	75·2	83·1	75·6	—	73·9	73·9	86	156	S W by S	0·54	95	Heavy rain before 2 A. M. Showery and dull.
24	29·654	82·7	75·3	89·1	76·4	98·7	73·8	72·2	72	141	S W by W	0·02	100	Overcast.
25	29·633	84·8	74·8	90·9	78·2	100·8	75·2	70·4	63	186	W by S	—	93	Overcast.
26	29·657	84·0	75·1	90·8	79·4	98·8	75·8	71·3	67	130	W S W	—	100	Overcast.
27	29·668	84·5	74·9	91·9	78·6	98·6	73·6	70·7	64	162	W by S	0·06	84	Cloudy.
28	29·689	85·1	75·6	94·3	78·2	104·6	73·3	71·6	65	173	S W	—	72	Cloudy.
29	29·732	85·9	76·0	94·3	78·4	102·8	73·7	71·8	64	134	S S W	—	73	Passing clouds.
30	29·721	85·6	77·5	96·0	78·9	99·8	74·0	74·3	70	141	S by W	0·02	70	Chiefly overcast. Thunder shower before midnight
31	29·738	87·2	76·2	96·0	78·6	106·9	74·9	71·6	61	167	S W by S	—	64	Passing clouds.
Mean...	29·690	84·5	75·9	92·4	78·0	103·2	74·0	72·3	68	153	S W	0·77	71	
Average..	29·721	83·9	75·6	91·9	78·4	105·9	76·2	72·1	69	207	SW by W	1·98	77	
Difference	—0·031	+0·6	+0·3	+0·5	— 0·4	— 2·7	—2·2	+0·2	—1	—54	1 Point S	—1·21	—6	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

August. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity,	Velocity	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents.	
1	29·773	86·1	76·8	94·5	78·6	108·9	72·9	73·0	66	168	S S W	0·01	49	Flying clouds. Shower at 11 P. M.
2	29·788	83·9	75·8	96·4	77·4	108·9	73·6	72·4	70	151	S W by S	—	59	Cloudy. Thunder and lightning.
3	29·748	84·6	76·7	95·2	76·6	106·4	72·8	73·5	70	174	S W	—	70	Cloudy.
4	29·741	81·9	74·6	92·0	77·5	109·9	71·9	71·5	72	122	S S W	0·08	82	Nearly overcast. Rain at 2½ P. M.
5	29·760	78·0	74·1	92·5	76·0	109·1	73·0	72·4	83	130	S S W	0·74	83	Nearly overcast. Frequent rain.
6	29·737	82·2	76·4	91·2	75·6	108·9	72·8	74·1	78	135	S W	0·05	87	Nearly overcast. Shower at 5½ P. M.
7	29·727	83·2	78·2	92·5	76·9	105·1	73·4	76·3	80	150	SW by W	0·48	68	Chiefly overcast. Rain as 5, 6 & 10½ P. M.
8	29·750	82·4	75·9	89·2	76·4	101·9	73·1	73·2	74	149	W S W	—	94	Overcast.
9	29·749	81·4	74·2	92·1	77·3	103·7	73·7	71·1	72	165	SW by W	0·23	100	Overcast. Rain from 8 to 9 P. M.
10	29·727	82·2	75·6	91·5	76·5	103·1	72·9	72·8	74	136	W S W	0·08	84	Chiefly overcast, Rain at 10 P. M.
11	29·687	80·8	74·4	84·5	76·3	—	71·7	71·6	75	115	W by S	0·04	100	Overcast. Shower at 10 P. M.
12	29·643	85·1	74·3	93·6	76·4	104·9	72·0	69·5	61	181	W S W	—	67	Heavy passing clouds.
13	29·680	84·9	74·5	93·3	77·4	103·7	73·3	69·9	62	191	SW by W	0·01	70	Cloudy. Shower at 6¾ P. M.
14	29·694	86·4	74·8	94·1	77·2	104·7	72·7	69·7	59	168	W S W	—	74	Chiefly overcast.
15	29·694	85·1	74·2	95·9	78·8	107·9	72·7	69·3	60	167	S W	0·03	66	Cloudy. Showers at 5½ and 10 P. M.
Mean....	29·727	83·2	75·4	92·6	77·0	106·2	72·8	72·1	70	153	S W	1·75	77	
Average..	29·749	83·5	76·0	91·6	78·1	105·8	74·2	72·9	71	182	S W by S	2·08	72	
Difference	−0·022	−0·3	−0·6	+1·0	−1·1	+0·4	−1·4	−0·8	−1	−29	1 Point W	−0·33	+5	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

August. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind-		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass							
		Dry.	Wet	Max.	Min.	Max.	Min.	Dew Point	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
16	29·692	85·2	75·2	96·1	79·0	108·1	74·7	70·9	64	168	S W	0·09	72	Flying clouds. Showery evening.
17	29·710	83·3	75·9	93·1	77·8	104·0	74·6	72·9	72	170	S S W	0·41	74	Cloudy. Rain at 5¼ A.M. & between 8¾ & 11 P.M.
18	29·740	83·5	76·3	94·9	76·0	105·9	72·5	73·4	73	164	S S W	0·29	63	Passing clouds. Rain at 5½ P.M.
19	29·771	83·8	77·6	90·9	76·3	109·8	72·7	75·2	76	135	S	—	45	Partly fine. Cloudy night.
20	29·797	83·6	77·6	92·4	76·6	109·1	73·4	75·3	77	141	S W	0·26	57	Rain before sunrise and at 5¾ P M.
21	29·789	83·2	77·3	91·8	79·2	107·7	73·9	75·0	77	136	S by W	0·01	59	Light showers.
22	29·773	84·5	77·9	93·3	78·2	108·1	74·5	75·3	75	146	S W by S	0·09	39	Chiefly fine. Shower at 11¼ P. M.
23	29·791	84·6	77·2	92·3	77·4	112·7	73·4	74·3	72	136	S	—	44	Chiefly fine.
24	29·803	85·2	77·0	91·2	77·6	109·1	72·5	73·7	69	125	S S E	—	28	Chiefly fine.
25	29·805	84·9	78·1	92·3	79·4	113·6	74·7	75·5	75	118	S S E	—	50	Light clouds.
26	29·788	83·8	76·2	93·1	78·4	115·6	73·7	73·1	71	113	S S W	0·16	50	Fine morning; cloudy night. Rain at 10½ P. M.
27	29·786	82·2	77·9	91·2	75·6	103·1	73·8	76·3	83	132	S S W	0·08	50	Shower at 1 A. M. Fine day.
28	29·758	84·7	78·0	92·1	78·6	112·1	75·4	75·4	75	138	S S E	—	35	Passing clouds. Fine night.
29	29·729	85·2	78·5	92·1	78·7	110·1	75·4	76·0	75	134	S S E	—	22	Chiefly fine.
30	29·726	82·6	76·3	94·1	76·6	112·9	72·7	73·7	76	129	N	—	65	Hazy clouds.
31	29·719	84·3	76·8	92·8	77·9	110·7	75·9	73·8	71	124	S S E	—	50	Light clouds.
Mean....	29·761	84·0	77·1	92·7	77·7	109·5	74·0	74·4	74	138	S by W	1·39	50	
Average..	29·753	82·8	75·8	90·3	77·7	105·8	74·4	72·9	73	175	S W	1·78	71	
Difference	+0·008	+ 1·2	+ 1·3	+ 2·4	0·0	+ 3·7	— 0·4	+ 1.5	+1	— 37	3 Points S	—0·39	-21	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

September. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.	Dew Point.	Humidity.	Velocity.	Direction			
		Dry.	Wet.	Max.	Min.	Max.	Min.							
	Inches.	°	°	°	°	°	°	°	Cents.	Miles.	Points.	Inches.	Cents.	
1	29·695	83·5	77·1	91·6	78·2	112·0	73·7	74·6	75	117	SW	—	67	Cloudy.
2	29·687	85·1	77·1	89·4	78·2	96·7	76·1	73·9	70	146	S W	0·05	85	Nearly overcast. Shower at 10¼ P. M.
3	29·727	77·6	73·8	83·2	74·3	—	72·4	72·1	84	170	W S W	0·75	100	Rain from I½ to 9 A. M. Thun. & lghtg.
4	29·712	80·6	76·3	86·2	76 2	92·0	74·4	74·6	83	73	SWbyW	0·01	96	Overcast. Fall before sunrise. [& lghtg.
5	29·691	79·5	75 3	83·4	76·0	87·2	73·3	73·6	82	78	W S W	0·27	100	Rain at 2½ & 6½ A. M. Overcast.
6	29·709	78·9	75·1	83·4	76·1	88·0	74·6	73 5	84	111	S W	0·19	100	Overcast. Rain from 6 to 10 P. M.
7	29·712	79·5	74·0	86·6	75·2	96·0	72·4	71·6	77	114	S WbyW	—	100	Overcast.
8	29·745	82·4	75·8	90·5	75·9	103·0	72·4	73·0	74	128	SWbyW	0·02	90	Nearly overcast.
9	29·731	84·4	76·4	91·3	75·6	102·9	71·6	73·1	70	119	S W	—	76	Chiefly overcast.
10	29·720	84·9	75·4	91·9	77·8	101·7	72·4	71·3	65	135	W S W	0·02	93	Chiefly overcast.
11	29·738	84·3	76·0	91·4	76·6	100·0	73·7	72·6	69	133	S Wby W	0·10	91	Rain about 1 A. M. Overcast.
12	29·810	83·5	75·8	91·7	77·4	102·0	73·7	72·6	71	160	S S W	0·02	82	Chiefly overcast.
13	29·839	82·0	76·8	91·7	77·4	106·0	73·8	74·7	79	155	S S W	—	65	Cloudy.
14	29·832	81·0	77·2	88·4	74·3	95·7	71·8	75·7	85	168	S S W	0·34	75	Rain from 2 to 4 A. M. Dull day. Fine evening.
15	29·788	84·1	75·6	92·6	76·2	105·0	73·6	72·0	68	157	S W	0·06	34	Fineday. Cloudy night. Shower at II P. M
Mean. ...	29·742	82·1	75·8	88·9	76·4	99·2	73·3	73·3	76	131	S W	1·83	84	
Average..	29·763	82·9	75·7	90·5	77·8	102·8	74·5	72·7	72	168	S W by S	2·08	68	
Difference	—0·021	—0·8	+0·1	—1·6	—1·4	—3·6	—1·2	+0·6	+4	—37	1 Point W	—0·25	+16	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

September. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds.	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
16	29·759	85·1	76·6	93·3	75·6	104·7	72·7	73·1	68	151	S W by W	—	37	Fine with flying clouds.
17	29·755	81·3	75·7	85·8	72·9	93·0	71·4	73·4	78	111	W by S	0·88	93	Rain till 2¼ A, M. Overcast.
18	29·769	80·0	75·0	87·1	76·4	99·5	72·5	72·9	80	131	S W by W	009	92	Shower at 1¾ A. M. Chiefly overcast.
19	29·754	85·3	76·0	91·6	76·8	102·1	72·8	72·1	66	145	W by S	—	55	Passing clouds.
20	29·709	86·0	74·9	93·5	78·5	106·0	72·9	70·0	60	175	S W by W	—	43	Fine with passing clouds.
21	29·705	84·0	73·5	90·2	77·7	102·0	73·5	68·7	61	171	W S W	0·03	89	Chiefly overcast.
22	29·710	82·9	72·3	87·2	76·5	96·0	72·8	67·2	61	196	W	—	100	Overcast.
23	29·716	85·3	74·4	92·4	79·3	101·0	74·4	69·6	60	147	W	—	74	Cloudy.
24	29·747	87·7	74·9	95·6	78·4	110·3	71·7	69·2	56	150	W by N	—	64	Passing clouds.
25	29·732	88·3	73·7	97·4	80·7	112·1	75·5	66·8	50	144	W by S	—	54	Passing clouds.
26	29·747	86·1	76·3	96·4	78·5	116·3	73·7	72·2	65	165	S S W	—	47	Light clouds.
27	29·766	86·4	77·2	94·8	77·7	117·2	74·3	73·5	66	150	S	—	20	Chiefly fine.
28	29·751	86·0	77·0	95·3	78·9	117·0	74·9	73·4	67	121	S by W	—	34	Flying clouds.
29	29·762	85·7	76·2	95·4	79·3	116·1	75·3	72·2	65	145	S	—	55	Partly fine. Thunder & lightning at 10 P.M.
30	29·749	85·7	78·4	93·4	77·7	104·1	73·8	75·6	73	139	S	0·21	88	Rain after midnight. Day nearly overcast.
Mean ...	29·742	85·1	75·5	92·6	77·7	106·5	73·5	71·4	65	149	S W by W	1·21	63	
Average..	29·796	82·2	76·1	89·1	77·1	106·6	74·1	73·6	76	136	S S W	2·20	62	
Difference	—0·054	+ 2·9	—0·6	+ 3·5	+ 0·6	—0·1	—0·6	—2·2	—11	+ 13	3 Points W	— 0·99	+ 1	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

October. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers. Shade.		Sun.	Grass.	Deduced.		Wind.		Rain.	Clouds.	Weather.
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity,	Velocity.	Direction.			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
1	29·723	85·7	78·3	96·5	77·6	112·1	73·9	75·5	73	155	by W	—	62	Cloudy.
2	29·725	85·9	77·2	95 8	79.0	111·3	74·6	73·7	68	160	Variable	—	91	Overcast and stormy. (See note.)
3	29·752	83·3	75·2	93·1	75.8	104·3	71 9	71·7	70	157	S W	0·99	93	Thunder storm until 1¾ A.M. Overcast.
4	29·758	84·3	75·8	94·0	77·8	114·3	73·5	72·2	68	154	S SW	—	65	Chiefly overcast.
5	29·734	85·3	75·2	93·7	77·6	105·9	72·9	70·9	63	140	S W	—	70	Cloudy.
6	29·735	84·5	77·1	95·3	77·4	112·1	73·2	74·2	72	145	by E	—	44	Cloudy. Clear night.
7	29·779	84·4	76·5	95 0	77·4	110·2	73·6	73·3	70	132	S	—	22	Light clouds.
8	29·813	85·9	76·8	92·8	78·4	114·2	73·1	73·1	67	107	S E by S	—	10	Fine.
9	29·836	84·0	77·7	92·8	78·8	111·4	74·1	75·3	76	108	S S E	—	19	Light haze.
10	29·820	84·8	77·5	91·5	77·6	107·7	73·4	74·6	72	123	S E	—	23	Light clouds.
11	29·841	84·5	77·0	90·2	77·9	107·5	74·7	74·0	71	103	S E	—	22	Chiefly fine.
12	29·866	83·7	76 3	89·7	77·1	109·0	72·9	73·3	72	96	E by S	—	43	Passing clouds.
13	29·855	83·3	76·6	91·3	78·9	115·2	75·4	73·9	74	108	N N E	—	70	Heavy clouds.
14	29·868	75·9	73·8	78·4	75·6	81·4	72·6	72·9	91	115	N W	3·22	90	Overcast. Rain from 5½ A.M. to 1 P.M.
15	29·846	77·0	75·6	83·4	74·9	107·2	73·9	75·0	94	84	N N W	1·10	91	Overcast Rain at 7 A.M. and at 3 and 7 P.M.
Mean	29·797	83·5	76·4	91·6	77·5	108·3	73·6	73·5	73	126	S by E	5 31	54	
Average...	29·822	80·8	76·0	86·5	75·9	107·7	73·5	74·1	81	122	S by E	5·08	58	
Difference	−0·025	+2·7	+0·4	+5·1	+1·6	+0·6	+0·1	−0·6	−8	+4	Same.	+0·23	−4	

October 2nd and 3rd. A thunder storm from 11¾ P.M to 1¾ A.M. with vivid and almost incessant lightning. The wind remarkably unsteady all the time, vering through more than a complete revolution each way—retrograde and direct.

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

October. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds.	Weather.
		Dry.	Wet.	Shade. Max.	Shade. Min.	Sun. Max.	Grass. Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
16	29·853	81·1	77·1	84·9	75·9	107.2	74·2	75·5	48	106	N	0 23	77	Rain at 6½ A. M. & 10½ P M.
17	29·798	77·6	75 2	82·5	75·7	99·7	74·2	74·2	89	99	N by W	1·33	56	Rain, chiefly before 4 A. M.
18	29·767	80·7	76·6	85·7	74·6	107·2	71·6	75·0	81	137	N by E	—	54	Passing clouds.
19	29·682	79·6	76·0	82·7	76 7	86·2	72·8	74·5	85	349	N E	0·87	95	Stormy. Rain at 5 A. M. and 8½ P. M
20	29·797	76·4	74 8	83·8	74·9	100·2	72·6	74·1	93	185	S E by S	2·57	95	Rain ; heaviest at 6 A. M.
21	29·888	76·2	75·2	82·6	74·3	94·2	72·4	74·8	96	115	S S E	3·81	99	Overcast. Heavy steady rain.
22	29·885	77·2	75·2	81·5	73·4	95·2	72·6	74·4	91	52	Variable	0 07	100	Overcast. Shower at 10¼ A. M.
23	29·872	76·7	73·9	82·0	71·7	98·2	71.6	72·7	88	111	N	1·41	85	Chiefly overcast. Rain from 4½ to 11½ A. M.
24	29·837	78·4	74·3	83 3	73·2	95·3	71·4	72·5	83	125	N N W	0·02	75	Chiefly overcast.
25	29·827	75·4	73·9	76·4	73·1	77·3	71·3	733	93	98	S W	1·45	100	Overcast ; raining till 1½ P. M.
26	29·794	79·2	75·4	85·4	73·9	99·3	73·2	73·8	84	61	S W by W	—	75	Passing clouds.
27	29·769	80·0	75·3	86·3	75·2	111·5	72·3	73·3	81	96	S E	—	8	Fine.
28	29·849	80·8	77·0	87·3	76·6	111·3	73·2	75·5	85	86	E	—	10	Fine.
29	29·886	81·0	75·0	86·3	76·9	105·8	73·4	72·5	76	107	N by E	—	27	Passing clouds.
30	29·889	79·6	75·3	85·2	75·1	108·5	70.4	73·5	82	74	N	—	23	Light clouds.
31	29·854	80·3	75·1	84 8	74·6	106·2	69·4	72·9	79	83	N N E	—	27	Nearly fine.
Mean......	29·828	78·7	75·3	83·8	74·7	100·2	72·3	73·9	86	118	N E by E	11·78	63	
Average..	29·873	79.0	74·5	84·2	74·3	100·7	71·8	72 6	82	129	N E	7.87	58	
Difference	—0·045	—0·3	+0·8	—0·4	+0·4	—0·5	+0 5	+1·3	+4	—11·	1 Point E	+ ·91	+ 5	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

November. First Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather-
				Shade.		Sun.	Grass.							
		Dry	Wet.	Max.	Min	Max.	Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents.	
1	29 853	80·4	75·7	85·3	75·9	104·9	71·9	73·7	81	140	N N E	—	36	Flying clouds.
2	29·878	79·2	70·6	83·6	75·0	100·2	71·3	66·3	66	171	N N E	—	20	Fine.
3	29·902	76·9	69·3	83·4	69·8	102·3	64·6	65·4	69	148	N N E	—	17	Light haze.
4	29·891	75·5	68·0	82·9	69·7	102·1	60·3	64·0	69	114	N	—	14	Fine.
5	29·848	77·0	68 3	83·5	67 7	101·3	66·6	63·6	65	100	N	—	5	Fine.
6	29·849	78·8	71·6	83·9	72·6	105·3	65·5	68·2	71	124	N N E	—	49	Overcast till sunrise.
7	29·886	78·6	71·7	83·8	71·5	102·4	64·6	68·4	72	126	N N E	—	13	Fine.
8	29·908	78·6	70·8	83·5	71·7	103·5	65·1	67·0	69	136	N N E	—	14	Fine.
9	29·912	78·3	71·1	83·5	72·9	102·4	66·6	67·6	71	115	N E by N	—	49	Fine after sunrise.
10	29·935	77·8	71·2	82·8	71·1	104·6	64·7	68·0	73	120	N E by N	—	14	Fine.
11	29·942	76·9	71·1	83·0	70·5	104·9	63·9	68·3	76	106	N N E	—	14	Fine.
12	29·919	76·1	70·8	83·7	71·8	103·8	65·6	68·3	78	91	N N E	—	15	Fine.
13	29·900	76·8	71·4	84·8	69·5	105 4	62·4	68·9	77	77	N N E	—	0	Fine.
14	29·892	79·6	73·5	86·5	72·9	110·4	67·3	70·8	76	73	N	—	4	Fine.
15	29·919	79·8	74·5	84·7	74·1	107·8	68·2	72·2	79	100	E	—	31	Fine after sunrise.
Mean. ...	29·896	78·0	71·3	83·9	71·8	104·1	65·9	68·1	73	116	N N E	0·00	20	
Average.	29·914	77·6	72·1	82·3	73·1	102·1	69·5	69·6	77	140	N N E	6·28	60	
Difference	—0·018	+0·4	—0 8	+1·6	—1·3	+20	—3·6	—1·5	—4	—24	Same.	—6·28	—40	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

November. Second Half.	Mean Pressure reduced to 32°	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass,							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Cents	
16	29·939	77·3	75·1	83·5	73·9	106·0	65·8	74·2	90	80	NE	0·55	62	Cloudy and showery.
17	29 934	79·1	75·5	83·0	74·9	100·7	70·5	74·0	85	123	NNE	0·32	93	Nearly over cast. Rain after 5 P.M.
18	29·956	79·4	76·1	82·1	74·1	95·1	72·2	74·8	86	170	NbyW	0·26	97	Overcast with light showers.
19	29·983	77·3	73·8	82·9	76·5	99·6	74·2	72·3	85	183	NEbyE	0·42	80	Overcast. Rain at 4¾ and 7 P. M.
20	29·969	79·7	74·3	83·5	75·5	103·4	71·6	72·0	78	162	NE	0·01	60	Cloudy with light showers.
21	29·978	79·4	72·7	83·5	76·5	103·3	72·5	69·6	73	192	NE	0·02	49	Passing clouds.
22	29·999	77·4	69·7	82·2	71·7	101·6	65·9	65·8	69	138	NNE	—	35	Passing clouds.
23	30·003	75·9	73·4	82·4	70·3	103·6	63·7	72·3	89	98	N	0·09	63	Cloudy. Rain at 7¼ A. M.
24	30·005	77·5	72·9	82·9	72·5	105·0	68·7	70·8	81	115	NNE	0·01	50	Flying clouds.
25	29·993	78·3	72·2	83·0	73·2	103·6	70·7	69·4	75	140	N E by N	0·01	40	Flying clouds.
26	29·972	78·0	72·0	82·2	72·4	101·9	65·4	69·2	75	130	NNE	—	45	Fine with flying clouds.
27	29·958	76·8	70·6	82·1	71·3	101·5	65·4	67·6	74	131	NNE	—	36	Fine with flying clouds.
28	29·975	77·8	71·1	82·5	70·5	103·4	64·7	67·9	73	148	NNE	—	27	Flying clouds.
29	29·975	77·6	70·7	82·5	70·9	99·6	65·1	67·3	72	188	NbyE	—	28	Flying clouds.
30	29·952	77·7	70·3	81·6	73·9	100·4	70·5	66·7	70	243	NNE	0·34	82	Rain at 1½ A. M. Chiefly overcast.
Mean.	29·973	77·9	72·7	82·7	73·2	101·9	68·5	70·3	78	149	NNE	2·03	56	
Average. .	29·950	76·2	71·1	81·1	71·7	97·5	68·8	68·7	78	176	NNE	5·52	55	
Difference	+0·023	+1·7	+1·6	+1·6	+1·5	+4·4	—0·3	+1·6	0	—27	Same.	—3·49	+1	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

December First Half,	Mean Pressure reduced to 32°.	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind.		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humi, dity.	Velocity.	Direction			
	Inches.	°	°	°	°	°	°	°	Cents	Miles.	Points	Inches.	Cents.	
1	29·897	73·7	72·0	76·4	71·7	77·8	69·3	71·2	92	228	N	2·38	100	Overcast. Rain after sunrise.
2	29·955	75·0	73·3	77·0	72·0	77·0	71·1	72·5	92	182	N E	1·92	100	Overcast. Rain, heaviest about noon.
3	29·983	75·4	73·8	79·6	73·5	92·5	71·7	73·1	93	113	N E	1·55	100	Overcast. Rain, chiefly before sunrise
4	29·982	72·6	71·4	74·0	71·9	74·0	71·5	70·9	94	104	N	5·48	100	Heavy rain nearly all day,
5	29·998	73·5	71·5	76·4	71·6	76·4	70·9	70·6	91	103	N N W	1·98	100	Rainy and overcast.
6	29·964	76·3	71·6	79·6	73·0	99·8	72·5	69·4	80	154	N E	0·03	90	Chiefly overcast and showery.
7	29·968	75·5	70·8	79·6	70·0	100·8	65·7	68·5	80	102	N E	—	20	Fine.
8	30·001	73·9	70·8	78·9	68·9	99·2	64·5	69·3	87	98	N E	—	17	Light clouds.
9	30·024	74·4	67·0	79·0	67·0	99·4	61·0	62·9	69	106	N E	—	40	Cloudy at intervals.
10	30·022	74·3	67·5	79·0	69·5	100·6	63·8	63·8	71	115	N	—	31	Light flying clouds,
11	30·012	75·3	68·7	79·6	69·0	101·5	64·2	65·3	72	115	N N E	—	43	Flying clouds.
12	30·032	75·1	69·4	79·6	68·3	98·5	62·6	66·5	76	144	N E by N	—	40	Flying clouds.
13	30·037	74·4	69·0	79·6	70·0	99·3	65·6	66·3	76	151	N N E	—	20	Light clouds.
14	30·027	74·3	68·2	79·6	66·7	98·7	61·6	65.0	74	141	N E by N	—	30	Flying clouds,
15	30·015	74·8	68·5	79·8	67·6	99·3	59·8	65·2	73	160	N E by N	—	30	Flying clouds.
Mean. ..	29·994	74·6	70·2	78·5	70·0	93·0	66·4	68·1	82	134	N N E	13·34	54	
Average.	29·957	75·3	70·3	80·1	70·8	97·4	66·9	67·9	79	164	N N E	3·98	55	
Difference.	0·037	—0·7	—0·1	—1·6	—0·8	—4·4	—0·5	+0·2	+3	—30	Same.	+9·36	—1	

Daily Results of Meteorological Observations made at the Madras Observatory in the year 1863.

December Second Half.	Mean Pressure reduced to 32 °	Corrected Mean Temperature.		Self-Registering Thermometers.				Deduced.		Wind		Rain.	Clouds	Weather.
				Shade.		Sun.	Grass.							
		Dry.	Wet.	Max.	Min.	Max.	Min.	Dew Point.	Humidity	Velocity.	Direction.			
	Inches-	°	°	°	°	°	°	°	Cents	Miles.	Points.	Inches.	Gents.	
16	30·009	74·8	68·4	79·9	68·8	100·7	62·6	65·0	73	124	N E by N	—	19	Chiefly fine.
17	29·986	72·6	67·1	78·6	67·5	99·6	58·4	64·1	76	116	N N E	—	20	Fine with flying clouds.
18	30·031	73·5	67·9	79·4	65·2	100·5	57·4	64·9	76	120	N E by N	—	24	Fine with flying clouds.
19	30·035	74·4	67·8	79·5	70·4	98·5	62·6	64·2	72	160	N N E	—	19	Fine with flying clouds.
20	30·039	75·0	68·7	79·3	69·8	99·6	65·1	65·4	73	173	N N E	—	25	Fine with flying clouds.
21	30·055	74·7	67·2	78·9	67·8	99·0	60·3	63·1	68	144	N E by N	—	34	Fine with flying clouds.
22	30·038	74·0	68·4	79·4	68·0	98·7	60·3	65·5	76	119	N N E	—	40	Fine with flying clouds.
23	30·035	73·2	68·2	79·6	68·2	102·5	61·6	65·6	78	86	N N E	—	35	Chiefly fine.
24	30·036	73·4	69·3	79·6	65·6	101·3	57·6	67·3	82	109	N N E	—	36	Chiefly fine.
25	30·009	76·2	67·7	79·7	71·5	97·7	67·3	63·0	65	184	N N E	0·02	25	Chiefly fine.
26	29·989	76·0	69·0	80·2	71·2	98·5	64·6	65·4	71	192	N E by N	—	29	Chiefly fine.
27	29·991	75·2	69·2	80·1	68·8	98·3	63·6	66·2	74	167	N N E	—	60	Cloudy.
28	30·007	76·0	71·0	79·9	74·9	97·6	70·8	68·6	79	199	N N E	0·02	100	Overcast.
29	29·999	74·7	69·7	80·5	70·8	100·5	68·6	67·3	78	159	N N E	—	76	Cloudy.
30	29·988	72·5	67·6	78·9	67·8	99·0	61·2	65·0	78	131	N N E	—	22	Fine with passing clouds.
31	29·979	71·9	67·0	78·6	65·8	99·8	58·6	64·4	78	105	N N E	—	21	Flying clouds.
Mean ...	30·014	74·3	68·4	79·5	68·9	99·5	62·5	65·3	75	143	N N E	0·04	37	
Average	29·996	74·5	68·8	79·5	69·5	101·3	64·4	65·9	76	183	N N E	·3 3	50	
Difference.	+0·018	—0·2	—0·4	0·0	—0·6	—1·8	—1·9	—0·6	—1	—40	Same.	—2·29	—13	

Results of Meteorological Observations made at the Madras Observatory in the year 1863.

The year 1863 presented no extraordinary meteorological features throughout its entire course.

The mean annual atmospheric pressure was 29,835, — 0·009 less than the average of twenty years.—Its extreme range was 0·589 inch; viz. from 30·137, the reduced reading on both January 11th and 19th, to 29·548 on June 1st.

The highest temperature registered in full sunshine was 125·3, on May 1st.—In the shade, the lowest was 63·0, on January 1st and the highest 103·0 on June 5th.—The mean daily range was 13·3.—The annual means of temperature, evaporation and dew point, were, 81·2; 74·5; and 71·6, respectively; each half a degree above the usual numbers.—The humidity was the precise average value of past years, viz. 74 per cent.

The rainfall, amounting to 54·61 inches, was distributed over 99 days, and was 3·86 inches above the twenty year average, or 108 per cent thereof.

The greatest quantity received on any one day was 5·48 inches, on December 4th. More than one inch of rain was measured on seventeen days during the year 1863.

The mean daily velocity of the wind was 132 miles, and its mean direction S. E. by S.—Its quantity and duration from each of the thirty two nautical Points was as follows.—

From.	Miles.	Quarter Days.	From.	Miles.	Quarter Days.	From.	Miles.	Quarter Days.	From.	Miles.	Quarter Days.
North	568	18	East	576	26	South	3224	84	West	649	18
N by E	1228	38	E by S	555	24	S by W	2150	52	W by N	375	10
N N E	3578	100	E S E	725	26	S S W	1984	52	W N W	316	10
N E by N	4750	128	S E by E	690	28	S W by S	2529	70	N W by W	99	2
North East	2590	78	South East	1880	67	South West	3694	94	North West	264	9
N E by E	1911	54	S E by S	2281	76	S W by W	3031	78	N W by N	39	2
E N E	419	22	S S E	2572	66	W S W	3276	84	N N W	318	10
E by N	1226	41	S by E	1808	46	W by S	1169	31	N by W	397	16
North East Quarter.	16270	479	SouthEastQuarter.	11087	359	South West Quarter.	21057	545	North West Quarter.	2457	77

N. R. POGSON,
Government Astronomer.

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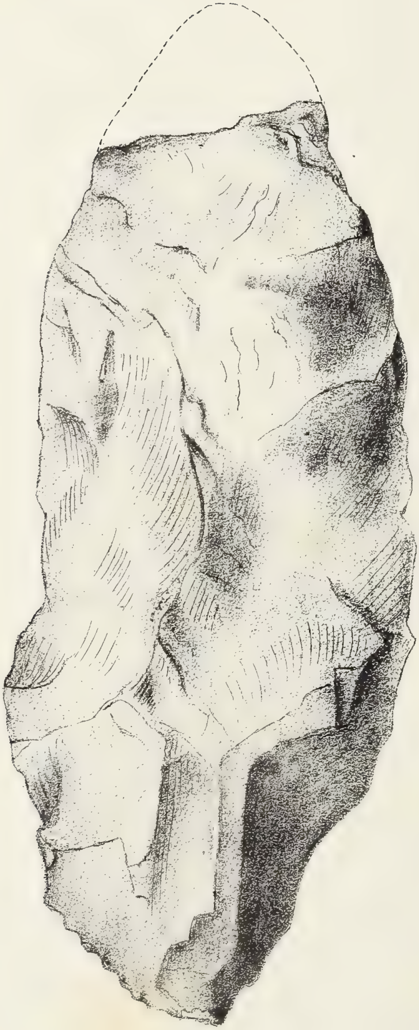

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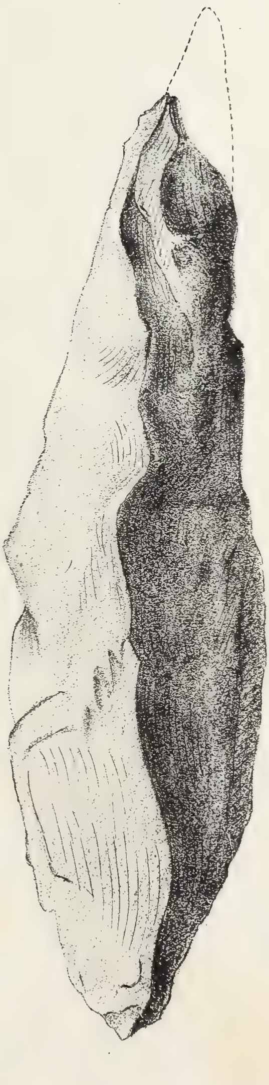
PLATE 1.*a.*



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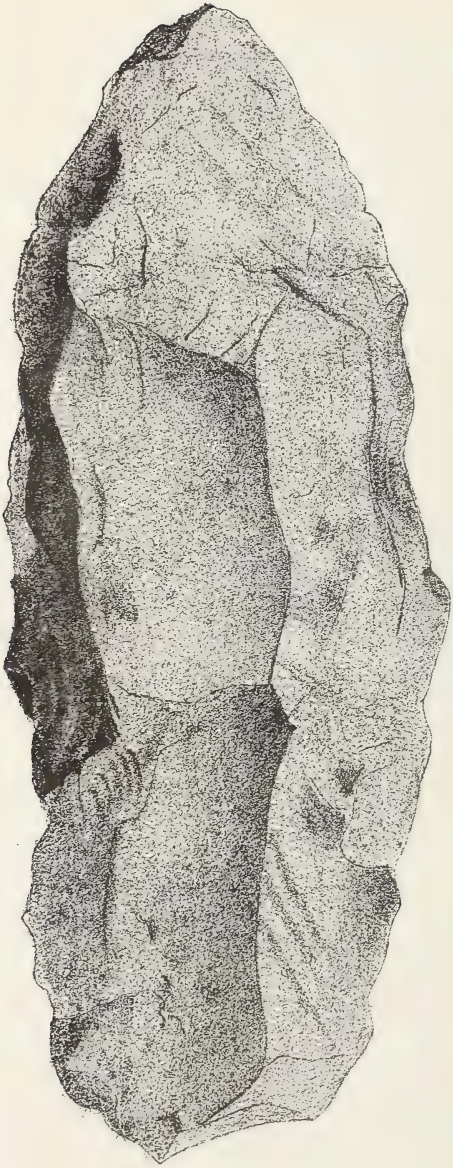

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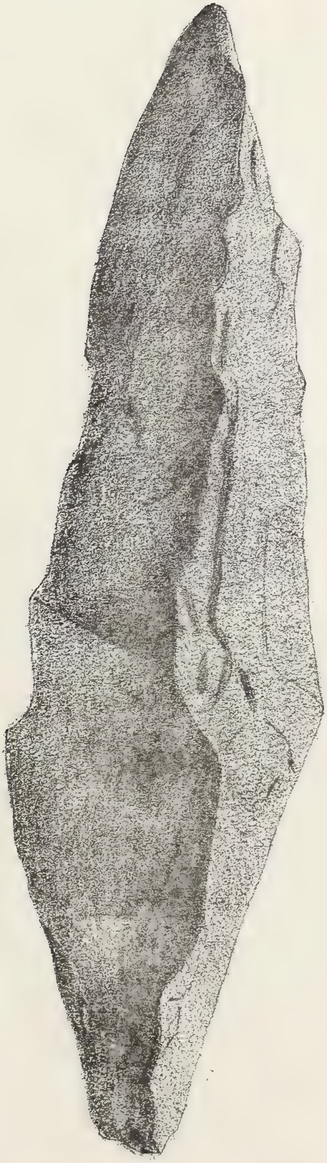

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PLATE. III.

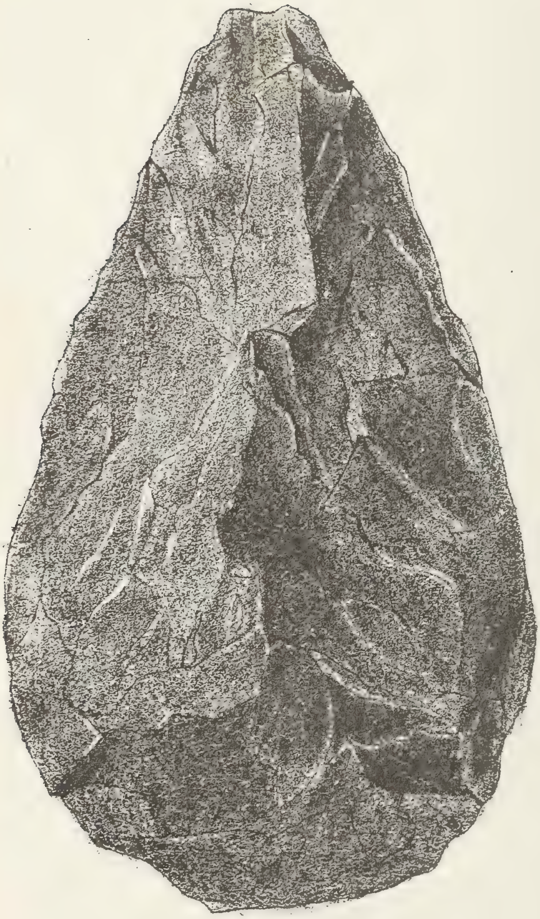

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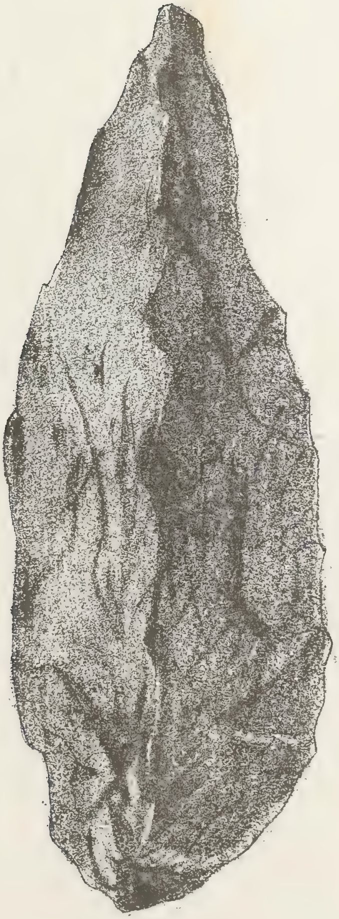
PLATE. III. *a*.



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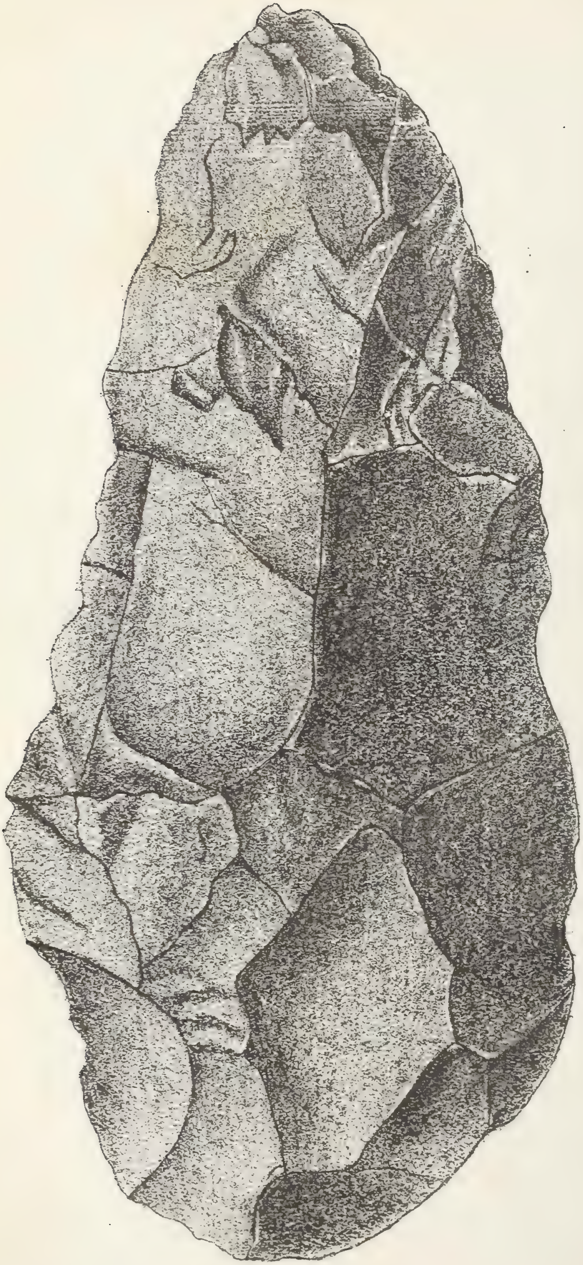
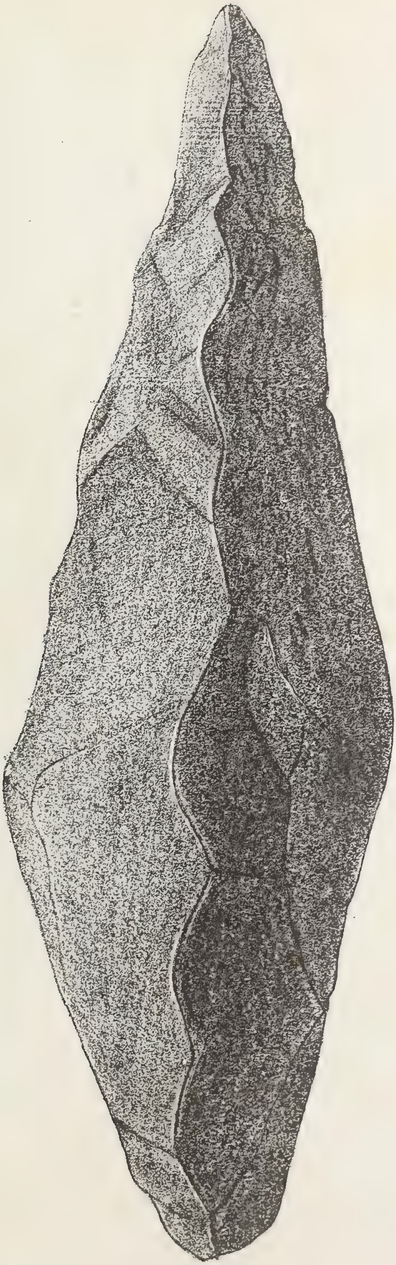
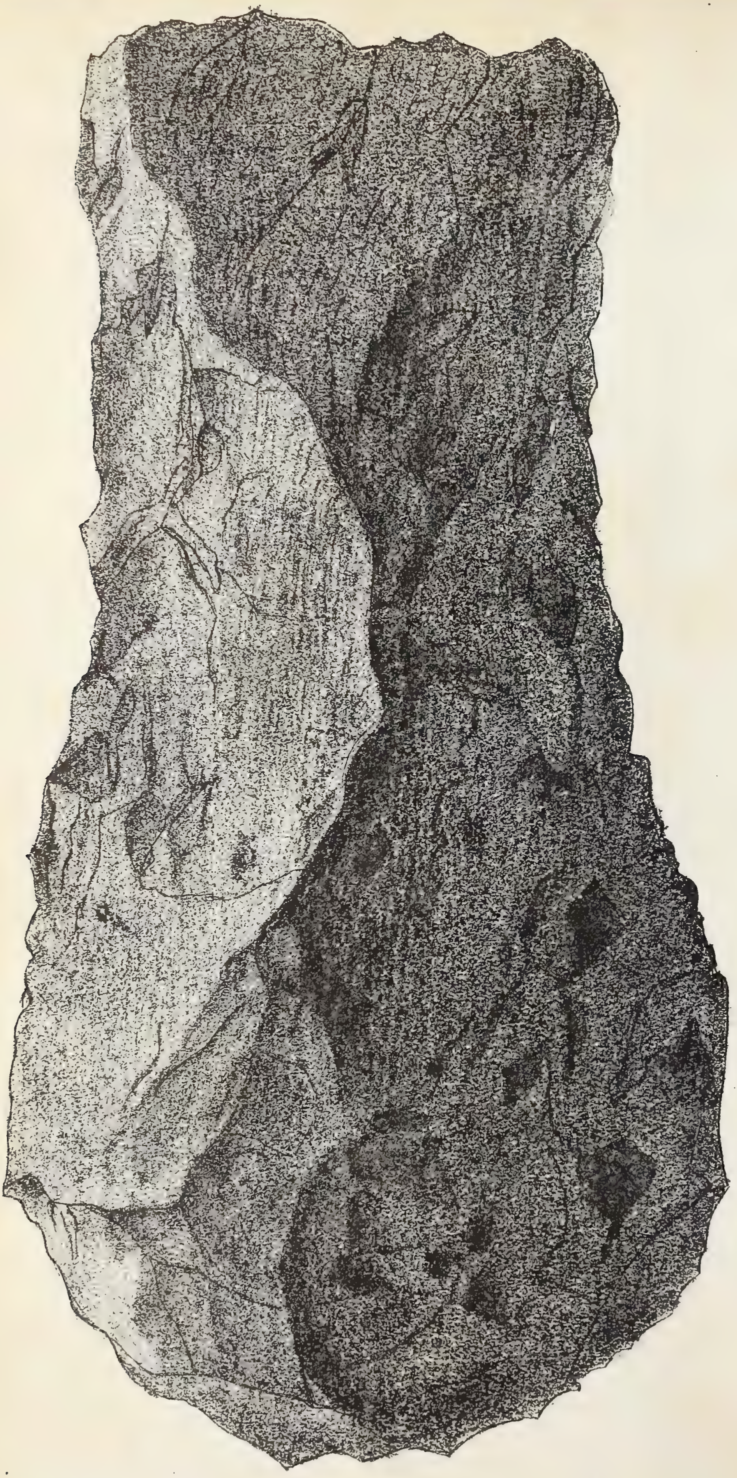


A. Barren, Lithog^r. Madras 1865.

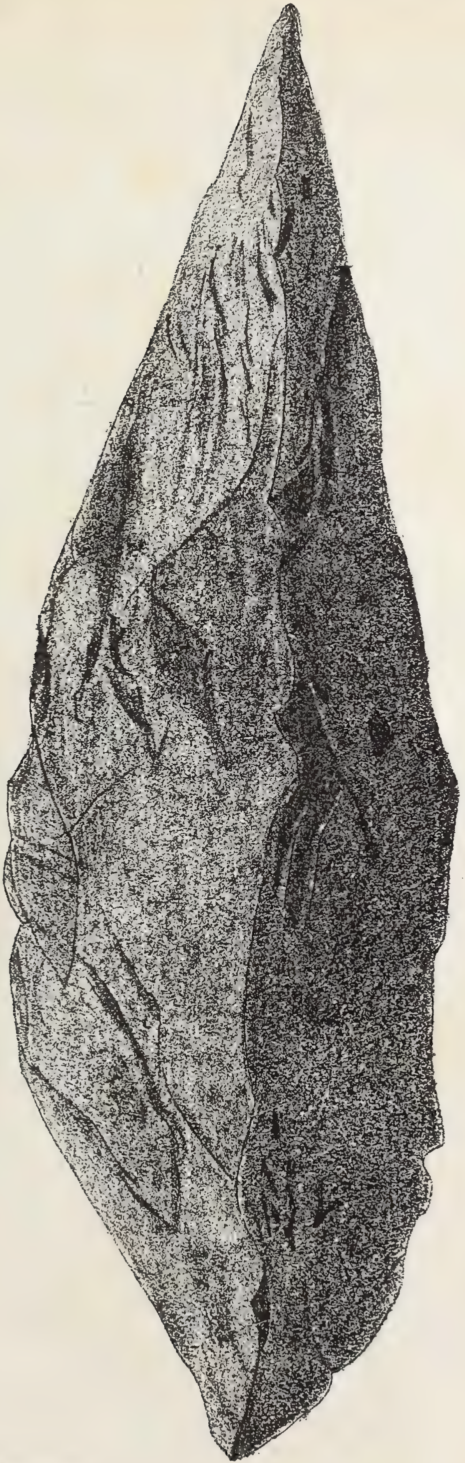


A. Barren, Lithog^r. Madras 1865.

PLATE, **V.**



Barren. Lithogr Madras 1865.



A. Barren, Lithog^r. Madras 1865.

BRITISH MUSEUM

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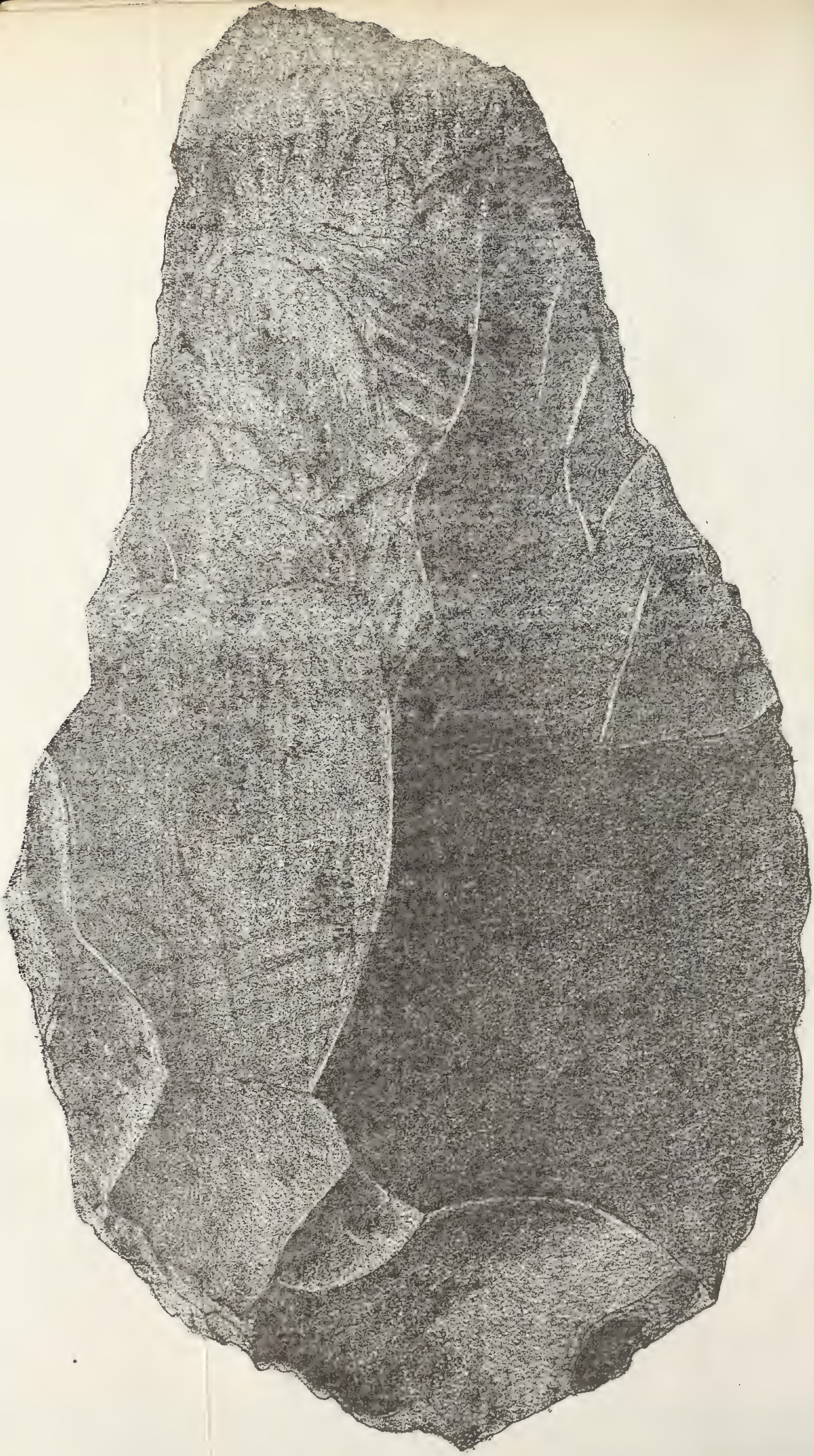

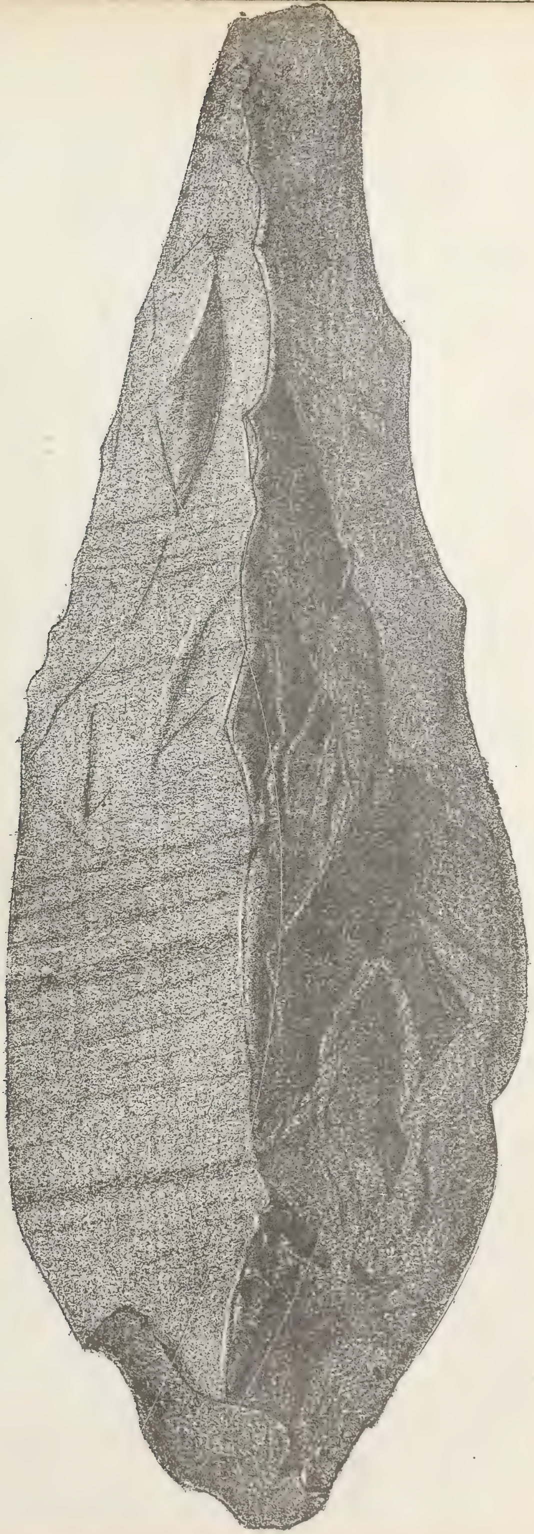

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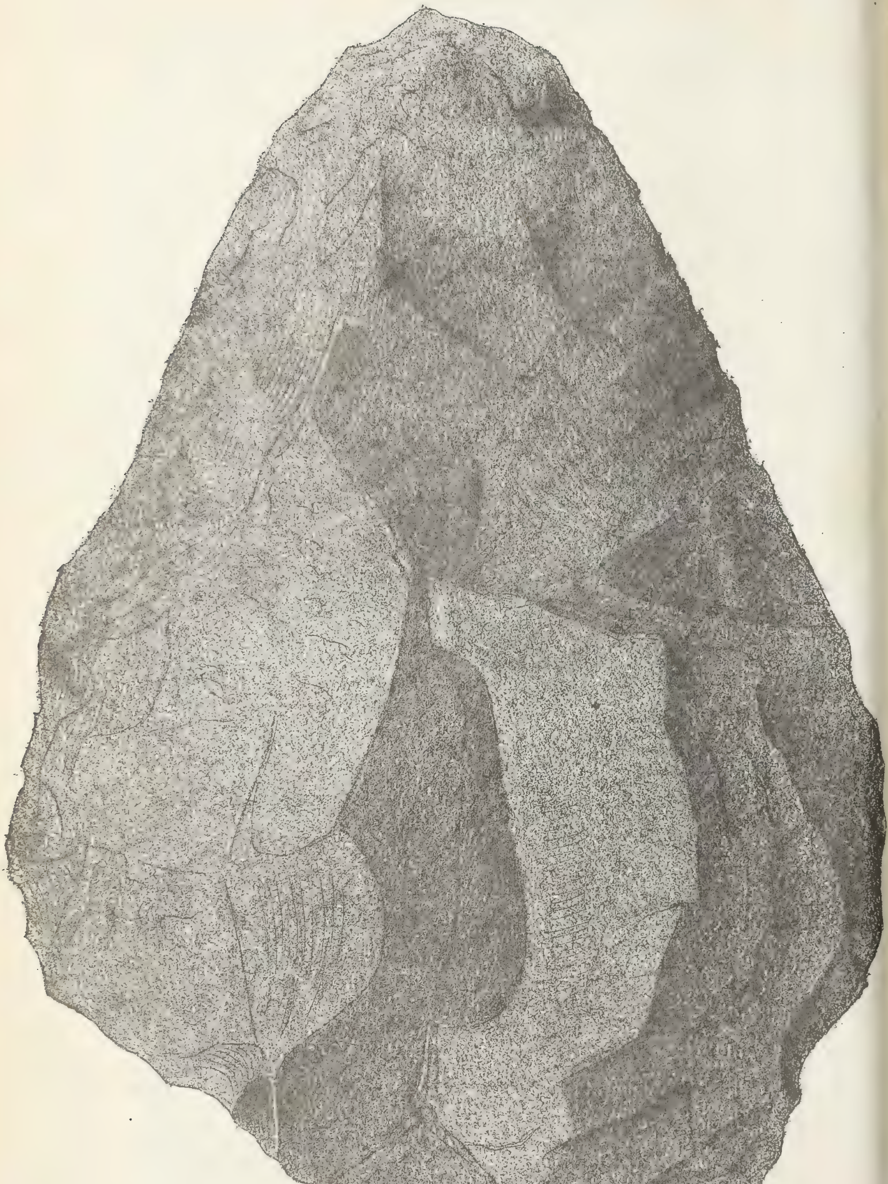
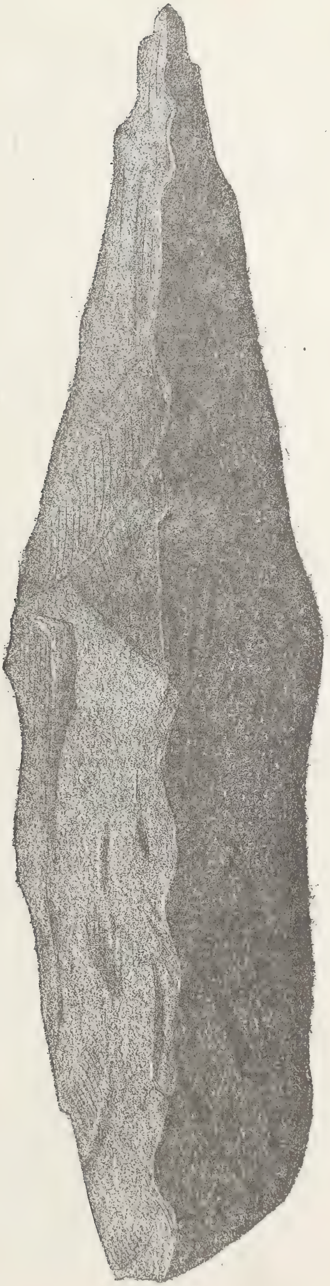
PLATE VIII.



A. Barren; Lithogr. Madras 1865.

PLATE VIII, a.



A. Barren, Lithogr. Madras 1865.

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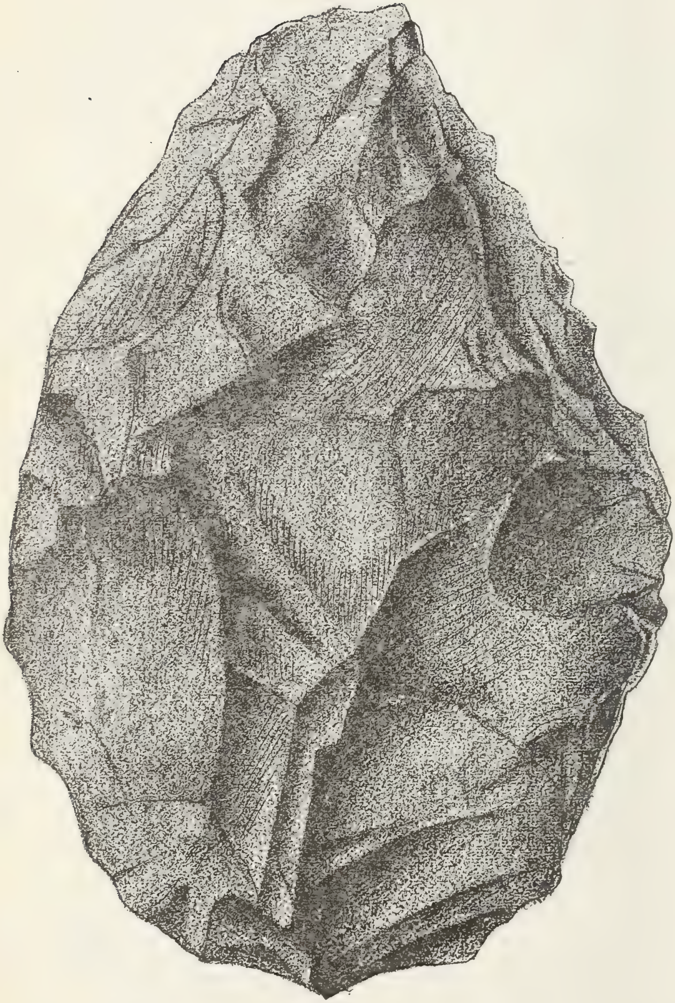
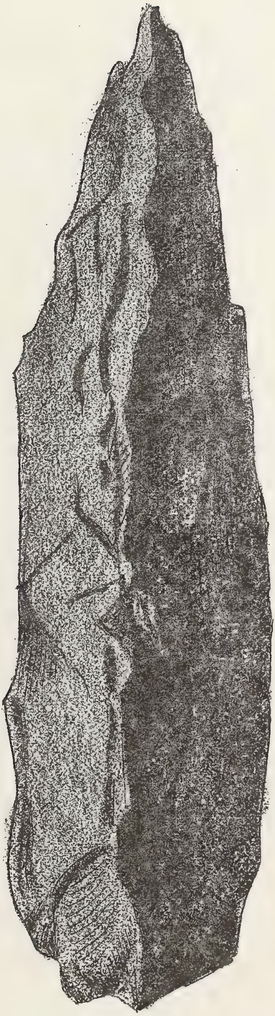
PLATE IX.



A. Barren Lithogr. Madras 1865.

PLATE. IXa.



A. Barren, Lithogr. Madras 1865

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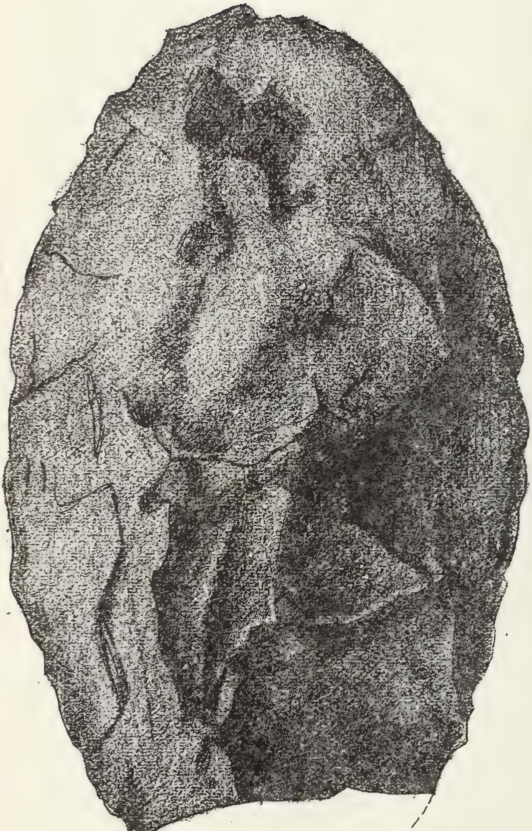
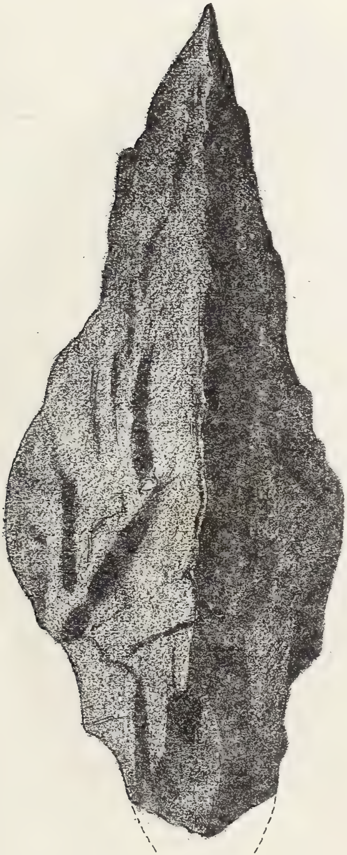
PLATE. X.



A.Barren,Lithogr. Madras.1865



A. Barren, Lithog^{r}. Madras. 1865

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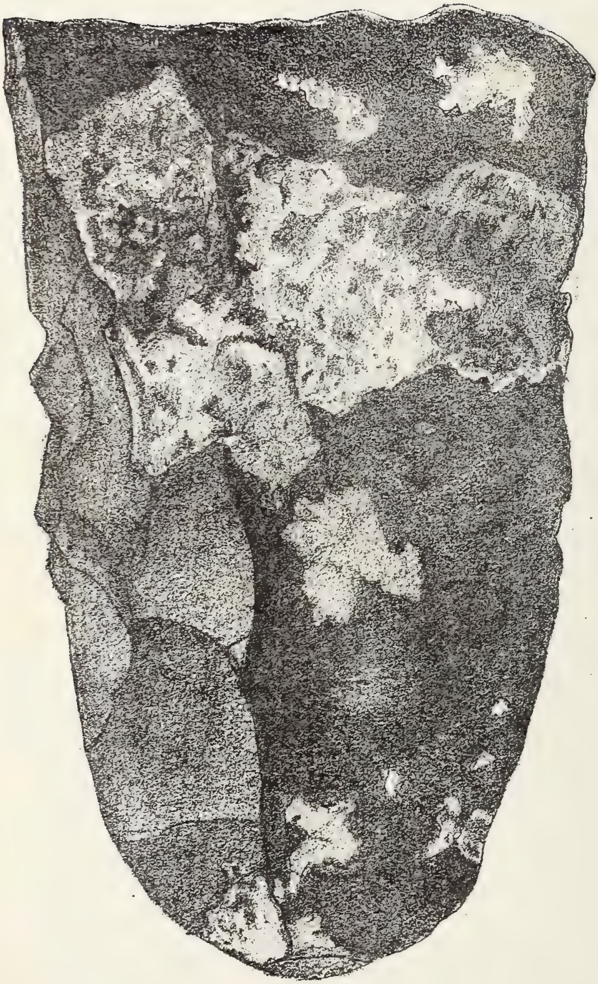
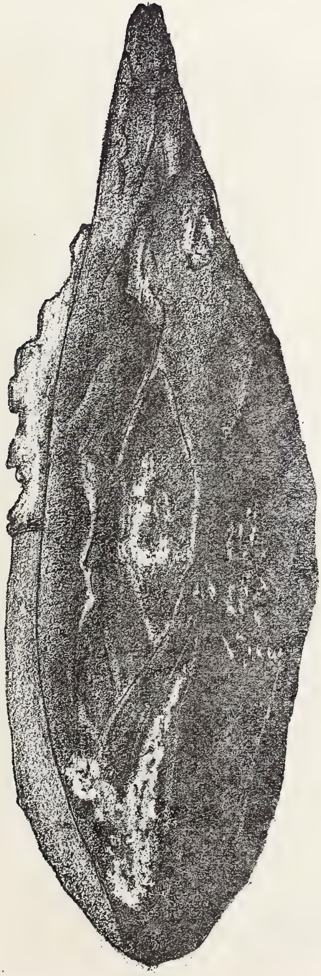


A. Barren, Lithogr. Madras 1865

PLATE XIa.



A. Barren, Lithogr. Madras 1865.

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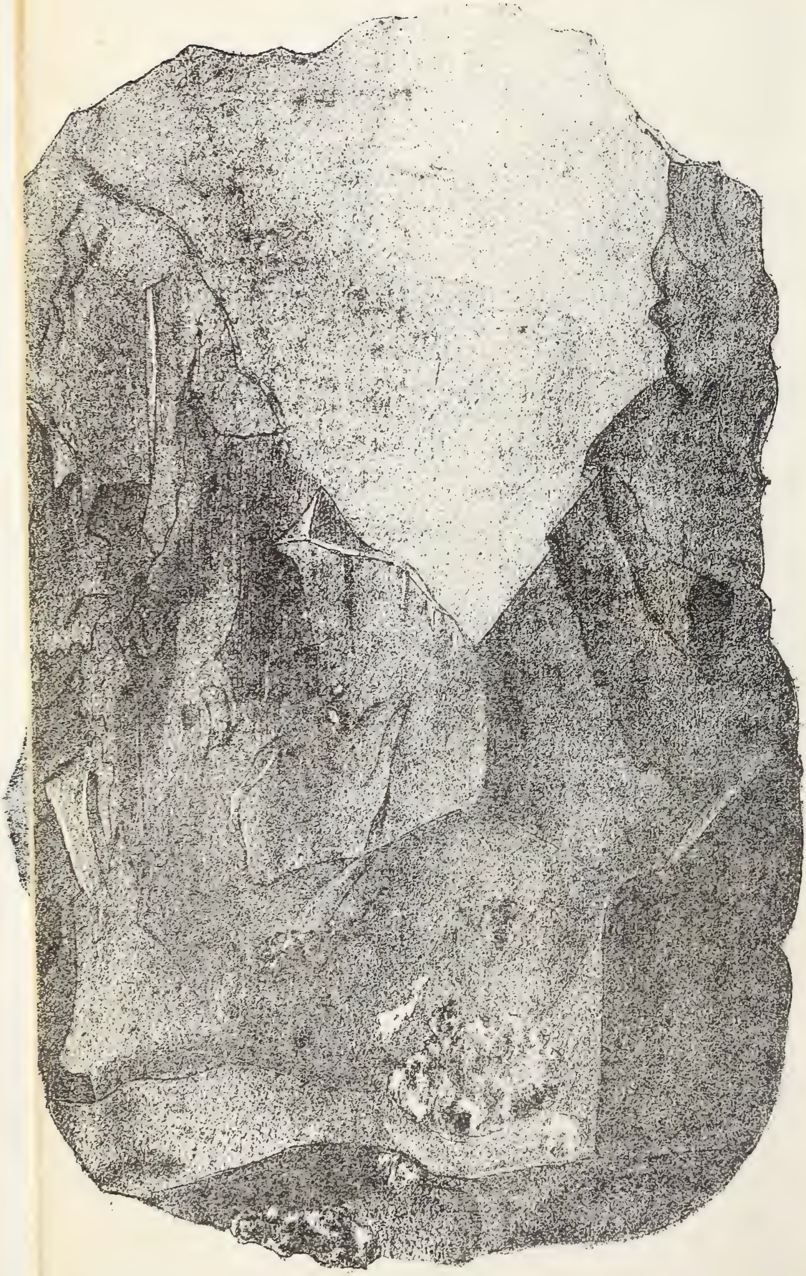
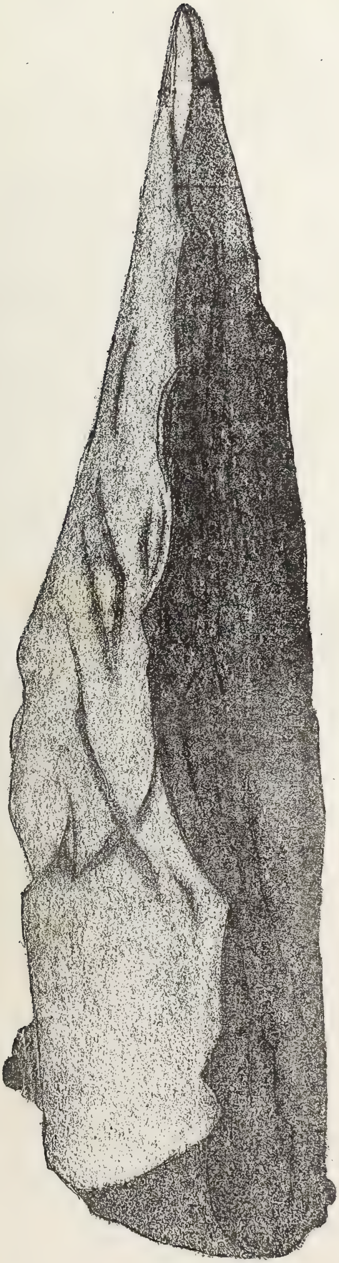
PLATE XII



rren, Lithogr. Madras 1865

PLATE XII.a



A. Barren, Lithogr. Madras, 1865.

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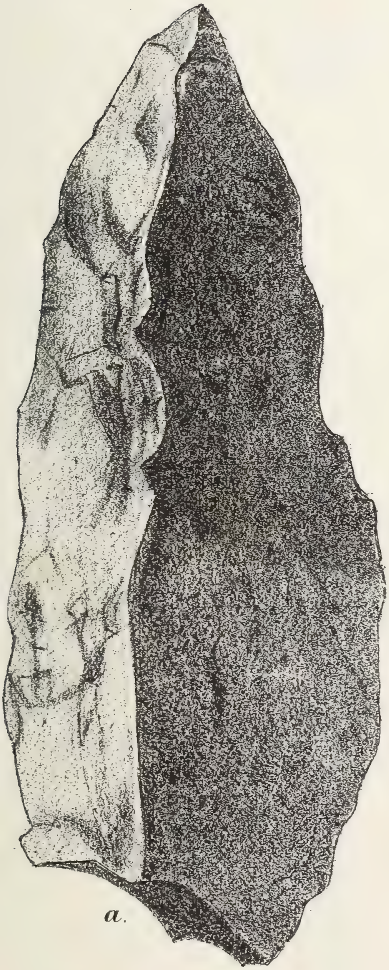
PLATE XIII.



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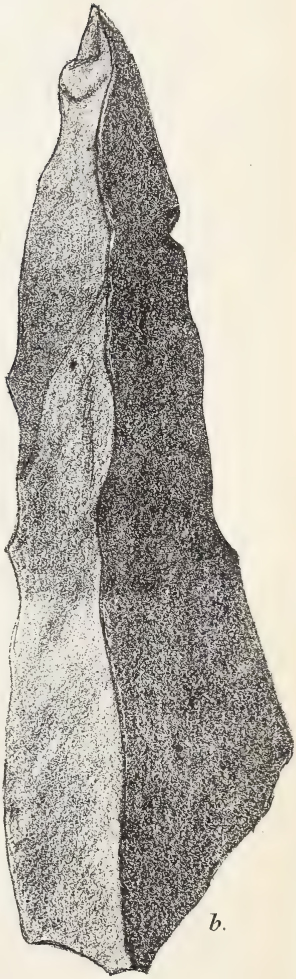

b.

A. Barren, Lithogr. Madras 1865.

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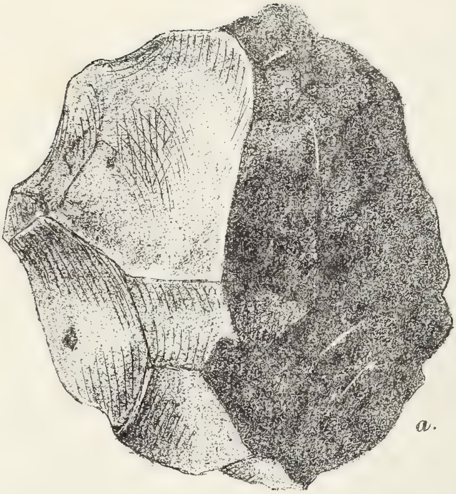
PLATE XIV.



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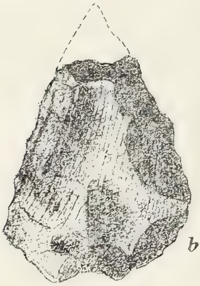

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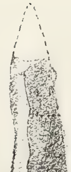
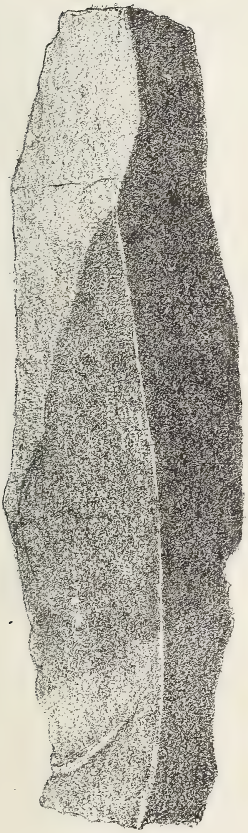


c.

A. Barren Lithog^{r}. Madras, 1865.

PLATE XV.



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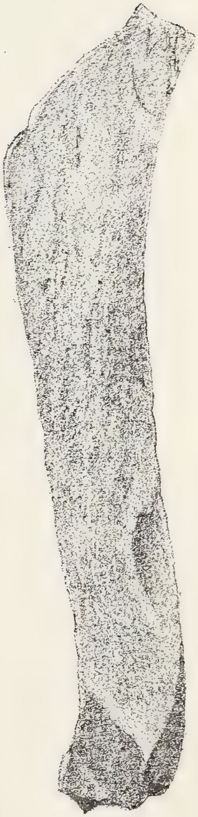

b.

A. Barren, Lithogr. Madras, 1865.

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